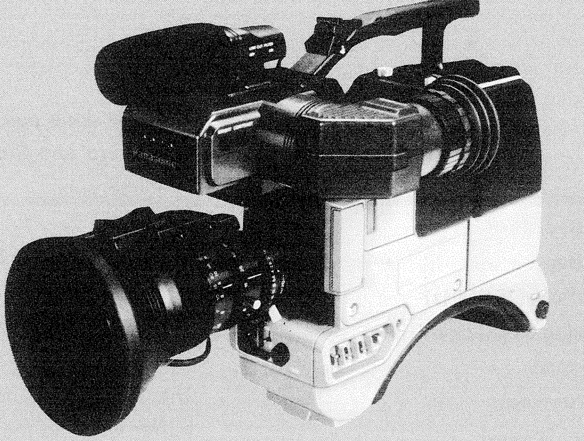
ORDER NO. AVS8909226C8

Service Manual

Color Video Camera
WV-F70 Series

Vol. 1

Circuit Description



Please file this circuit description (Vol.1) together with original Service Manual (ORDER No. AVS8904185C8).

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Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

2. PREAMP/DRIVE BOARD

2-1. Drive Pulse Generator Circuit

This circuit receives Vertical drive pulse (VD) from the Sync/Encoder board and horizontal drive pulse (HD) from sample hold circuit in this board and generates pulses for driving CCD image sensors.

The pin identification of CCD drive pulse generator IC103 is as follows.

IC103
MN5108
Pin Identification

Pin No.	Name	In/Out	Description
1	XO	-	Not Used
2	CLK2	-	Not Used
3	CLK	Out	Clock Pulse(25.4MHz)
4	SMPL	In	Sampling Clock(25.4MHz)
5	TEST	In	Test Mode
6	TEST1	In	Test Terminal
7	SS1	In	Shutter Speed-1
8	SS2	In	Shutter Speed-2
9	PNSW	In	NTSC/PAL Select(L:PAL)
10	PBLK	Out	Pre-Blanking Pulse
11	CPOB	Out	OB Clamp Pulse
12	FH2	-	Not Used
13	HD	In	Horizontal Drive Pulse Input
14	VD	In	Vertical Drive Pulse Input
15	V1	Out	Vertical Transfer Pulse-1
16	V2	Out	Vertical Transfer Pulse-2
17	VDD1	In	+ 5V DC Power
18	VSS2	-	Ground
19	V3	Out	Vertical Transfer Pulse-3
20	V4	Out	Vertical Transfer Pulse-4
21	CH1	Out	øV1 Charge Pulse
22	CH2	Out	øV2 Charge Pulse
23	CLR	In	Clear
24	H34	Out	Horizontal Transfer Pulse-2
25	H12	Out	Horizontal Transfer Pulse-1
26	R	Out	Reset Pulse
27	RWI	In	Reset Pulse Width Control
28	RWO	Out	Reset Pulse Width Control
29	DP3	Out	Sample Hold Pulse-3
30	I3	In	Buffer-3 Input
31	DP2	Out	Not Used
32	I2	Out	Buffer-2 Input
33	DP4	-	Not Used
34	DP1	-	Sample Hold Pulse-1
35	O3	-	Not Used
36	O2	-	Not Used
37	SP0	-	Not Used
38	SP2	-	Not Used
39	VSS1	In	Ground
40	VDD2	In	+ 5V DC Power
41	O1	-	Not Used
42	I1	In	Sample Hold Pulse Phase Control
43	SP1	-	Not Used
44	XE	In	OSC Input

The CCD drive pulses thus obtained are sent to Y channel CCD board and C channel CCD board for driving the CCD image sensors.

2-2. Y Sample Hold Circuit

This circuit receives the modulated Y signal from the Y channel CCD board and detects the Y signal.

The Y signal (A) modulated by 12.7 MHz is fed through buffer Q301 to sample hold circuit consists of Q302, R307, C304 and Q303 where the noise portion of modulated Y signal is gated by the sample hold pulse DP1 (SHP) (B) sent to the gate of Q302 and the signal corresponding to the noise level is detected. The detected noise (C) is sent through buffer Q304 to another sample hold circuit consisting of Q305, R313, C306 and Q306 where the noise component (C) is again gated by another sample hold pulse DP3 (SHD) (D) fed to the gate of Q305 and the noise component (E) is mode. The noise (E) is then sent to one input of differential amplifier consisting of Q310~Q314. On the other hand, the modulated Y signal (A) is sent through buffer Q307 to sample hold circuit consisting of Q308, R317, C309 and Q309 where the video signal portion of Y signal (A) is detected by the sample hold pulse DP3 (SHD) (D) fed to the gate of Q308 and the Y signal (F) is detected. The Y signal (F) is then applied to another input of differential amplifier where the Y signal (F) and the noise (E) are substracted each other and the noise mixed with the Y signal (F) is removed. The Y signal (G) thus obtained is sent through 12.7MHz low pass filters (LPF) CF301 and CF401, and the Y signal (J) is obtained. The Y signal is then sent through amplifier consisting of Q317~Q319, pin 31 of CN1, Mother board and pin 32 of CN1 to the Y process circuit on the Preamp/Drive board.

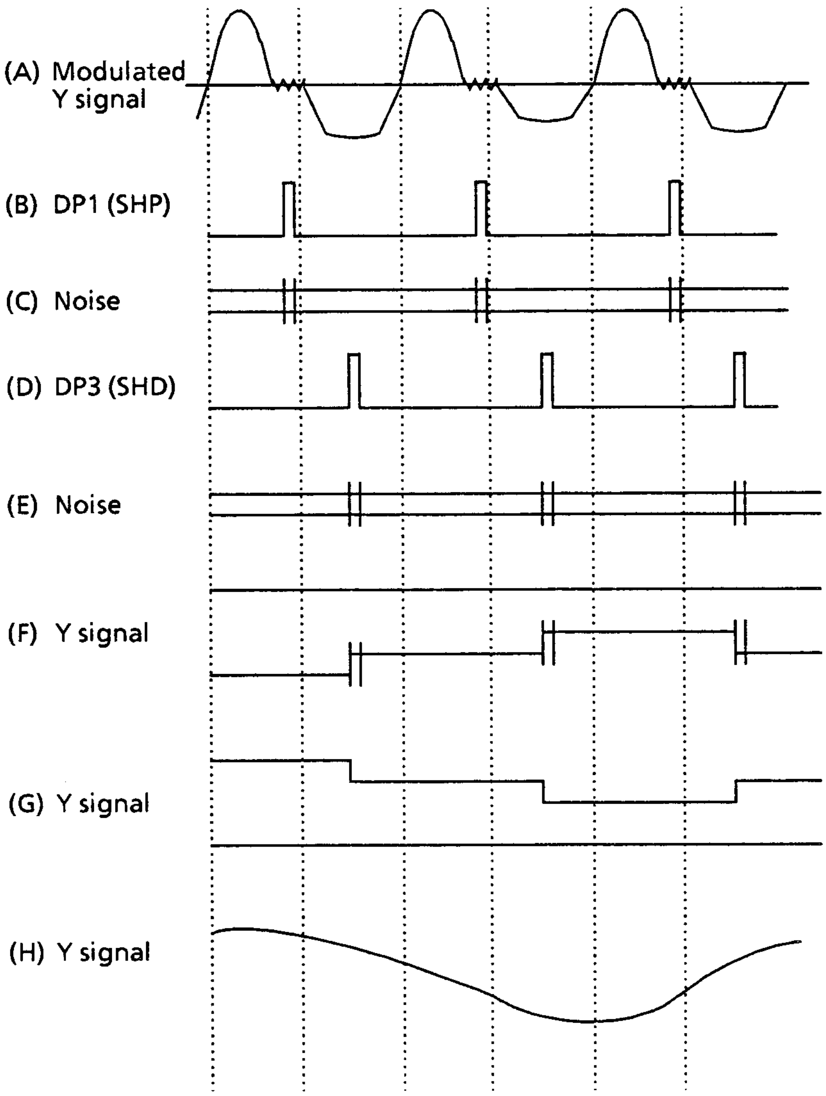

(A) Modulated Y signal
(B) DP1 (SHP)
(C) Noise
(D) DP3 (SHD)
(E) Noise
(F) Y signal
(G) Y signal
(H) Y signal

Fig. 2-1 Sample Hold

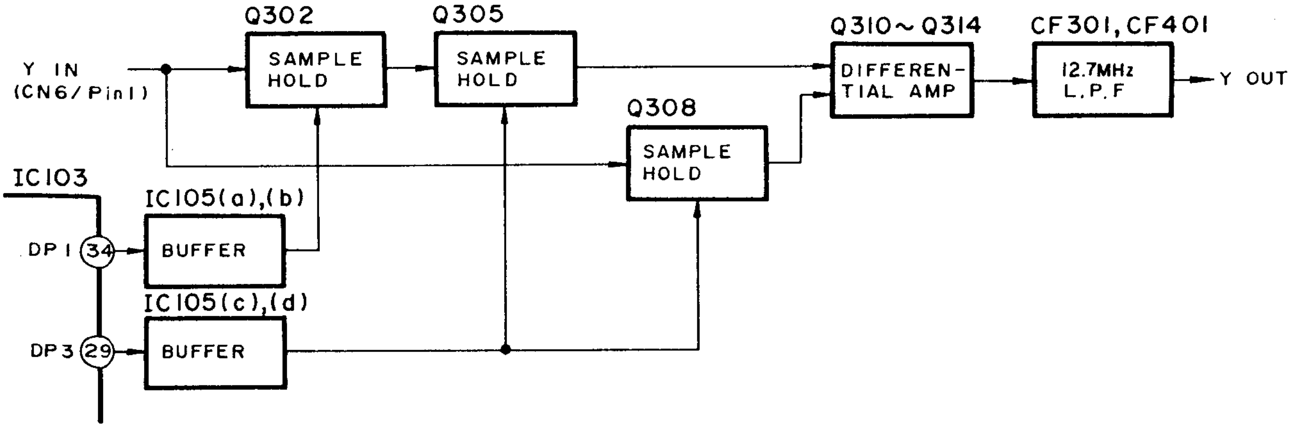

Y IN
(CN6/Pin1)
Q302
SAMPLE HOLD
Q305
SAMPLE HOLD
Q308
SAMPLE HOLD
Q310～Q314
DIFFEREN-TIAL AMP
CF301, CF401
12.7MHz L.P.F
Y OUT
IC103
DP1
34
DP3
29
IC105(a),(b)
BUFFER
IC105(c),(d)
BUFFER

Fig. 2-2 Y Sample Hold Circuit

2-3. C Sample Hold Circuit

This circuit receives the modulated C (chrominance) signal from the C channel CCD board and detects the R, G and B signal.

The C signal modulated by 12.7 MHz is fed through buffers Q320 and Q321 to R/G/B gate IC301 and detects R, G and B signals as shown below.

The C signal is separately fed to pins 4, 8 and 11 of RGB gate IC301 and R, G and B signals are gated by gate pulses SSH1, SSH2 and SSH3 supplied from pins 32, 31 and 29 of IC104 to pins 5, 6 and 12 of IC301.

On the other hand, The clamp DC generated by Q328 is fed through pins 2 and 1 of IC301 to gate of Q321 where the blanking level of C signal is fixed to +2.8V DC. The B signal obtained at pin 10 of IC301 is then supplied through amplifier consisting of Q326, Q327 and Q333 to 4.2MHz L.P.F VIC2 where the 4.2MHz component is removed. The B signal thus obtained is sent through buffer Q334 to Process/Detail board and Sync/Encoder board.

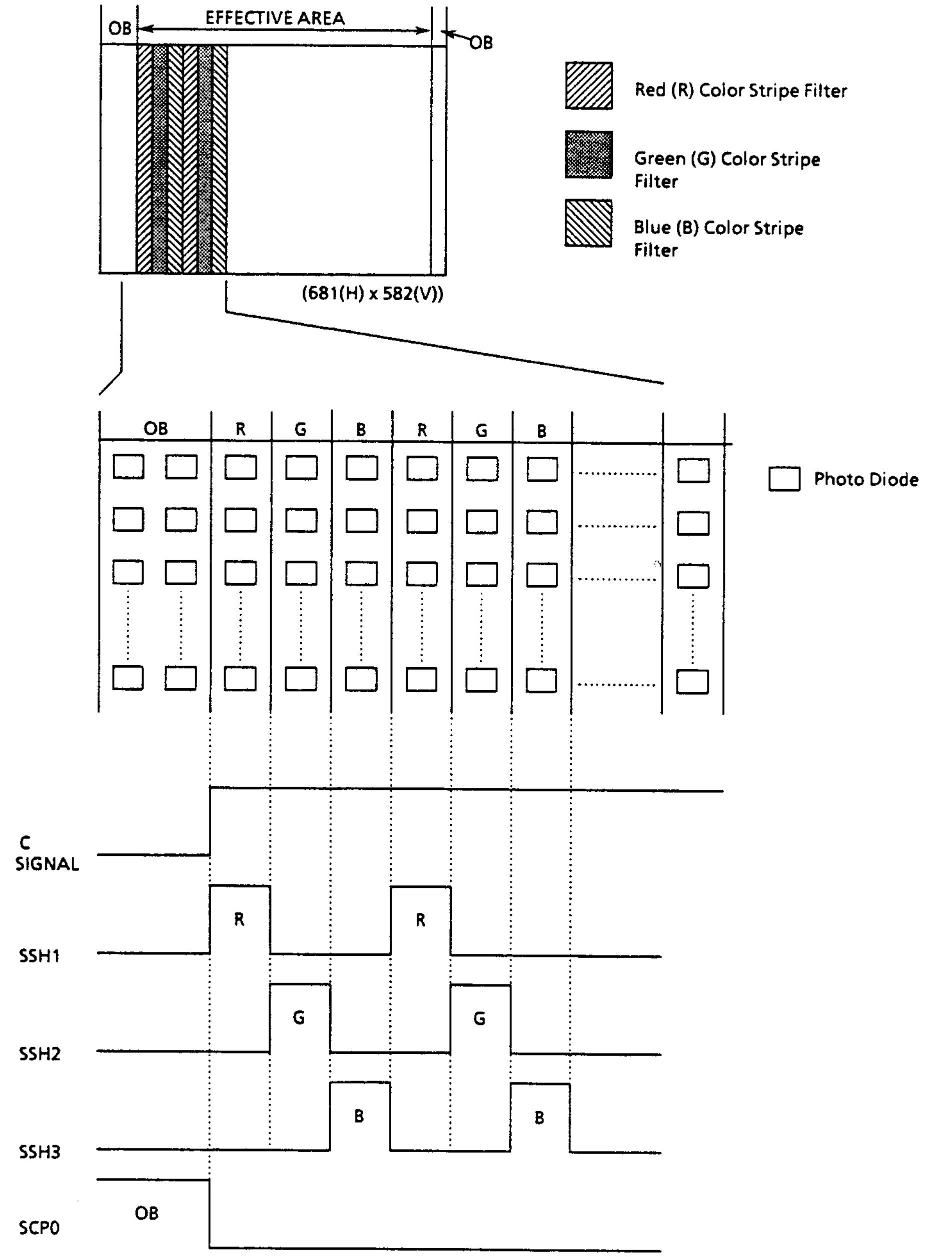

OB
EFFECTIVE AREA
OB
Red (R) Color Stripe Filter
Green (G) Color Stripe Filter
Blue (B) Color Stripe Filter
(681(H) x 582(V))
OB
R
G
B
R
G
B
Photo Diode
C SIGNAL
SSH1
R
R
SSH2
G
G
SSH3
B
B
SCPO
OB

Fig. 2-3 R, G and B Signal Gate

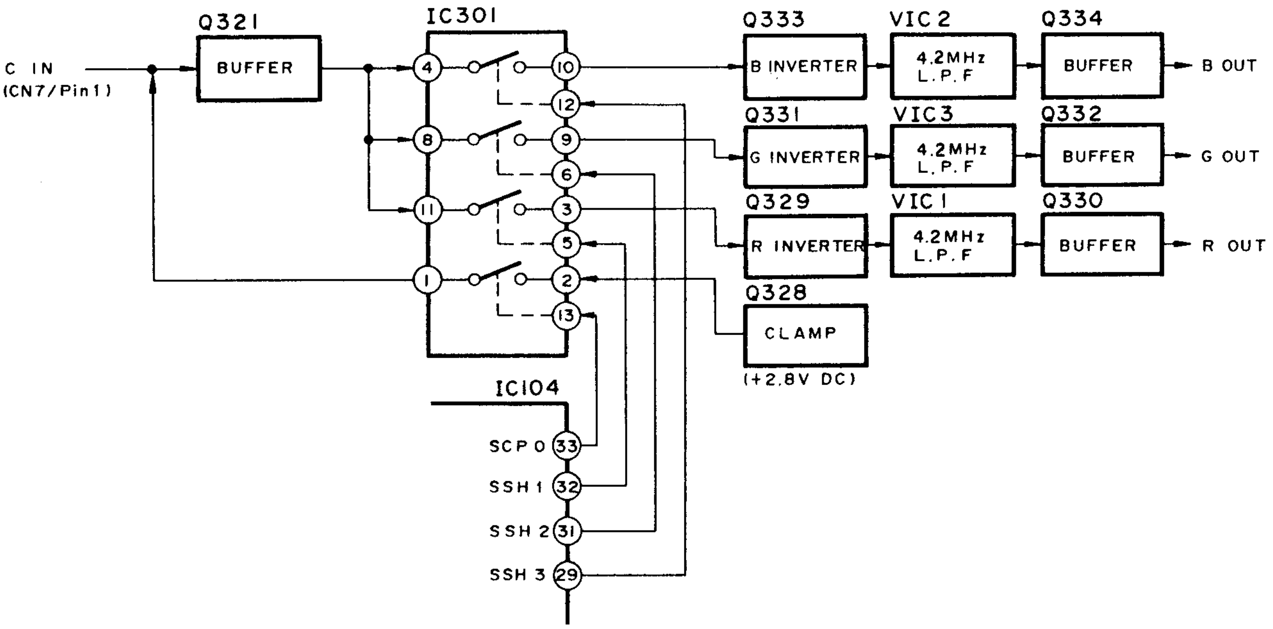

Q321
BUFFER
C IN
(CN7/Pin1)
IC301
4
10
12
8
9
6
11
3
5
1
2
13
Q333
B INVERTER
VIC2
4.2MHz
L.P.F
Q334
BUFFER
B OUT
Q331
G INVERTER
VIC3
4.2MHz
L.P.F
Q332
BUFFER
G OUT
Q329
R INVERTER
VIC1
4.2MHz
L.P.F
Q330
BUFFER
R OUT
Q328
CLAMP
(+2.8V DC)
IC104
SCP0 33
SSH1 32
SSH2 31
SSH3 29

Fig. 2-4 C Sample Hold Circuit

2-4. Y Process Circuit

This circuit receives Y signal from the Y sample hold circuit and forms the processed Y signal in order to make a detail signal and composite video signal.

2-4-1. Y Process Circuit-1 (Refer to Y signal processing circuit-1 (Fig. 2-5))

o Gain Control/Pulse Cancel Circuit

This circuit consisting of Q1~Q3 and IC1 (a) controls Y signal gain by VR2 (Y INPUT GAIN) and corrects pedestal level of Y signal by VR1 (Y PUL CAN) and VR10 (-6dB PUL CAN).

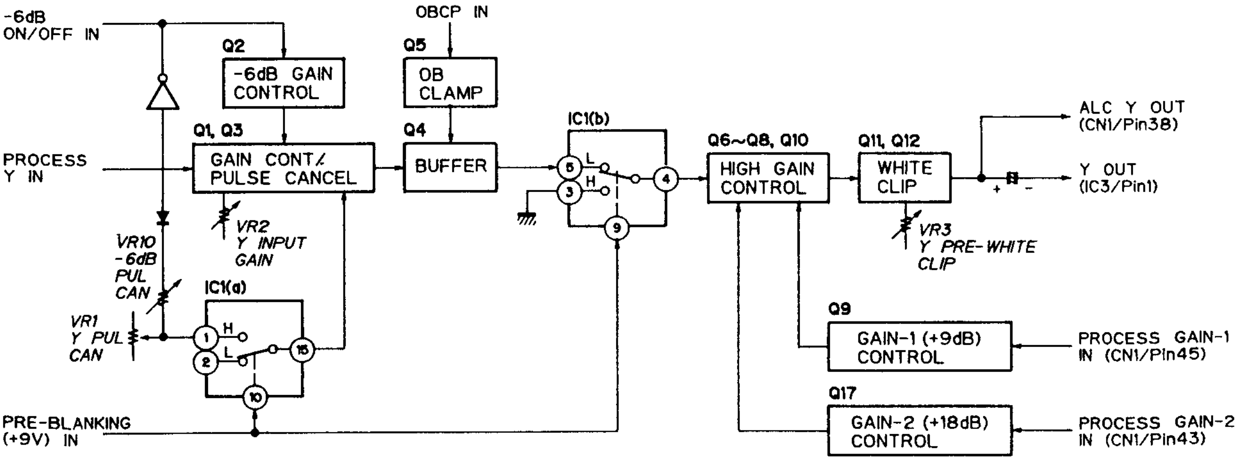

-6dB
ON/OFF IN
Q2
-6dB GAIN
CONTROL
OBCP IN
Q5
OB
CLAMP
PROCESS
Y IN
Q1, Q3
GAIN CONT/
PULSE CANCEL
Q4
BUFFER
VR2
Y INPUT
GAIN
VR10
-6dB
PUL
CAN
VR1
Y PUL
CAN
IC1(a)
H
L
1
2
15
10
IC1(b)
5
3
4
9
L
H
Q6~Q8, Q10
HIGH GAIN
CONTROL
Q11, Q12
WHITE
CLIP
VR3
Y PRE-WHITE
CLIP
ALC Y OUT
(CN1/Pin38)
Y OUT
(IC3/Pin1)
+
-
Q9
GAIN-1 (+9dB)
CONTROL
PROCESS GAIN-1
IN (CN1/Pin45)
Q17
GAIN-2 (+18dB)
CONTROL
PROCESS GAIN-2
IN (CN1/Pin43)
PRE-BLANKING
(+9V) IN

Fig. 2-5

o Optical Black Clamp/Blanking Period Detect Circuit

This circuit consisting of Q4, Q5 and IC1 (b) keeps constant the optical black clamp DC level and detects blanking period of Y signal.

o High Gain Control Circuit

This circuit controls the level of the Y signal by changing the gain of circuit when the High Gain Selection switch on the side of camera is set to 0dB, +9dB or + 18dB position.

o White Clip Circuit

This circuit consisting of Q11 and Q12 clips the high level of the Y signal at 840mV by adjusting VR3 (PRE-WHITE CLIP) when the high gain selection switch is set to + 18dB position.

The Y signal thus obtained at emitters of white clip Q11 and Q12 is supplied to other circuit and board.

1) Y signal for automatic lens control (CN1/Pin 38)
2) Y signal to pin 1 of IC3

2-4-2. Y Process Circuit-2 (Refer to Y signal Processing circuit-2 (Fig. 2-6))

The Y signal obtained at emitters of Q11 and Q12 is fed through C12 to pin 1 of IC3.

o Clamp and Gamma Correction Circuits in IC3

This circuits set the gamma correction of the Y signal by adjusting VR7 (Y GAMMA).

o White Clip Circuit

This circuit clips the high level of the Y signal at 770mV by adjusting VR8 (Y WHITE CLIP) when the High Gain Selection switch is set to 0dB position.

o Blanking Cleaner Circuit

This circuit eliminates the noise during the blanking period of the Y signal by receiving the pre-blanking signal.

o Pedestal Control Circuit

This circuit controls the pedestal level of the Y signal by adjusting VR9 (Y PED) . When the camera is set to the RCU operation mode, the pedestal control DC from RCU is fed through pins 13 and 14 of IC11(c) and buffer IC2 to pin 10 of IC3. When the camera is set to the camera mode, the pedestal control DC of the camera is sent through pins 12 and 14 of IC11(c) and buffer IC2 to pin 10 of IC3.

o Y Gain Control Circuit

This circuit controls the gain of the Y signal when the High Gain Selection switch is set to 0dB or + 18 dB position.

When the High Gain Selection switch is set to 0dB or +9dB position, high (H) potential is fed to the Gain-2 (+ 18dB) switching Q16 and turns it ON. As a result, pins 4 and 5 of IC4 is connected and the gain of the Y signal is controlled by adjusting VR4 (Y GAIN-1).

When the High Gain Selection switch is set to + 18dB position, low (L) potential is sent to Q16 and turns it OFF, and the gain of the Y signal is controlled by adjusting VR5 (Y GAIN-2).

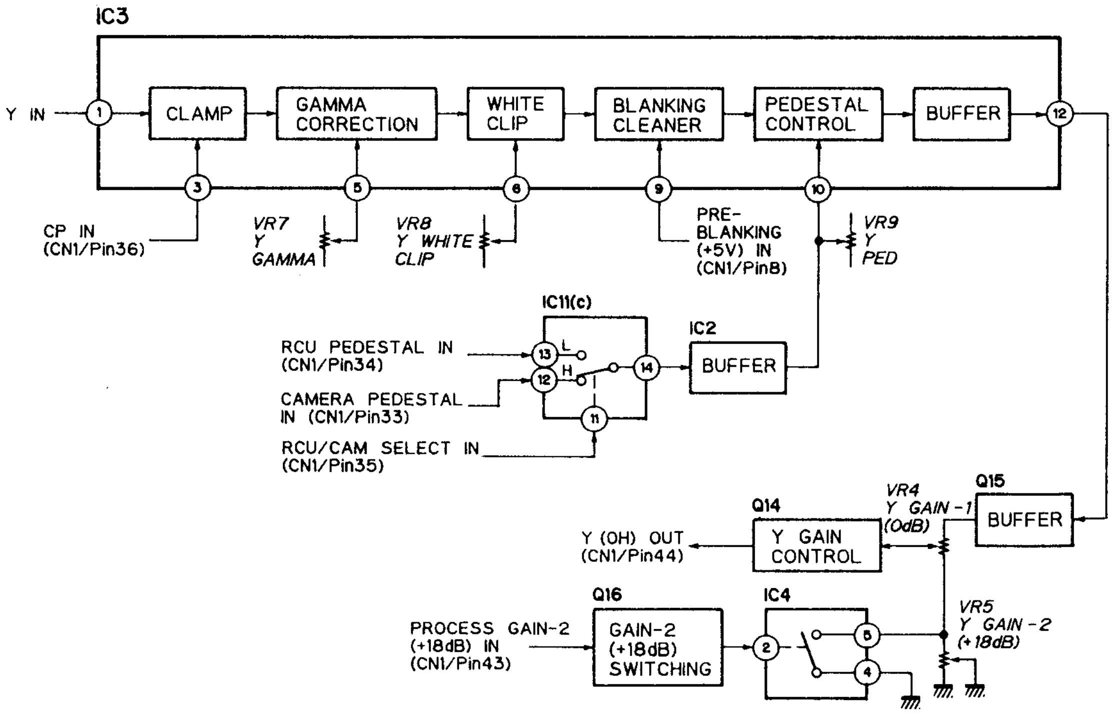
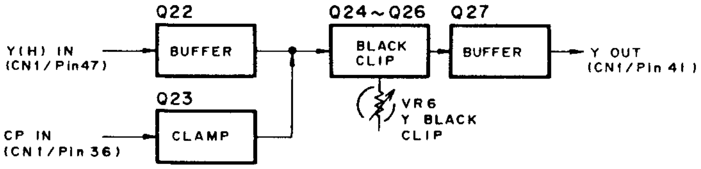

IC3
Y IN
CLAMP
GAMMA CORRECTION
WHITE CLIP
BLANKING CLEANER
PEDESTAL CONTROL
BUFFER
1
3
5
8
9
10
12
CP IN (CN1/Pin36)
VR7 Y GAMMA
VR8 Y WHITE CLIP
PRE-BLANKING (+5V) IN (CN1/Pin8)
VR9 Y PED
IC11(c)
IC2
RCU PEDESTAL IN (CN1/Pin34)
CAMERA PEDESTAL IN (CN1/Pin33)
RCU/CAM SELECT IN (CN1/Pin35)
13
L
12
H
14
11
BUFFER
Q14
Q15
VR4 Y GAIN-1 (0dB)
BUFFER
Y (OH) OUT (CN1/Pin44)
Y GAIN CONTROL
Q16
IC4
VR5 Y GAIN-2 (+18dB)
PROCESS GAIN-2 (+18dB) IN (CN1/Pin43)
GAIN-2 (+18dB) SWITCHING
2
5
4

Fig. 2-6

2-4-3. Y Signal Processing Circuit-3 (Refer to Y signal processing circuit-3 (Fig. 2-7))

The Y signal from the Process/Detail board is supplied through pin 47 of CN1 to the black clip circuit consisting of Q23~Q26 where the lower level of the Y signal is clipped and the pedestal level of the Y signal is set by VR6 (Y BLACK CLIP).


Q22
Q24~Q26
Q27
Y(H) IN (CN1/Pin47)
BUFFER
BLACK CLIP
BUFFER
Y OUT (CN1/Pin 41)
Q23
VR6 Y BLACK CLIP
CP IN (CN1/Pin 36)
CLAMP

2-5. DC Voltage Regulator Circuit

This circuits regulate the DC Voltages and sends them out to other circuit.

REGULATOR	INPUT	OUTPUT
+ 15V DC	+ 15.5V DC	+ 15V DC
+ 5V DC	+ 5V (a) DC	+ 5V(b) DC
- 5V DC	- 8.3V DC	- 5V DC
- 8V DC	- 8.3V DC	- 8V DC

3. PROCESS/DETAIL BOARD

3-1. R.G.B Process Circuit

This circuit receives R, G and B signal from the Preamp/Drive board and R, G and B signals are corrected in order to make video signal.

3-1-1. R Process Circuit

The R signal obtained at pin 20 of CN1 is fed through pin 1 of IC1 to the following circuit in IC1.

o Input Gain/Pulse Cancel Circuit

This circuit controls R signal input gain by adjusting VR2 (R INPUT GAIN) so that the R signal output on the Process/Detail board becomes 0.7V p-p.

The blanking period of the R signal is detected by pre-blanking signal and the pedestal level of the R signal is controlled by VR1 (R PUL CAN) so that it is not varied while changing the High Gain Selection switch between 0dB and + 18dB position.

o Optical Black Clamp Circuit

This circuit keeps constant the optical black clamp DC level of the R signal by suppling the OBCP (optical Black clamp pulse) to this circuit.

o High Gain Control Circuit

This circuit controls the level of the R signal by changing the gain of circuit when the camera gain is selected to -6dB, 0dB, +3dB, +9dB, +12dB or +18dB position by setting the High Gain Selection switch and -6dB ON/OFF switch.

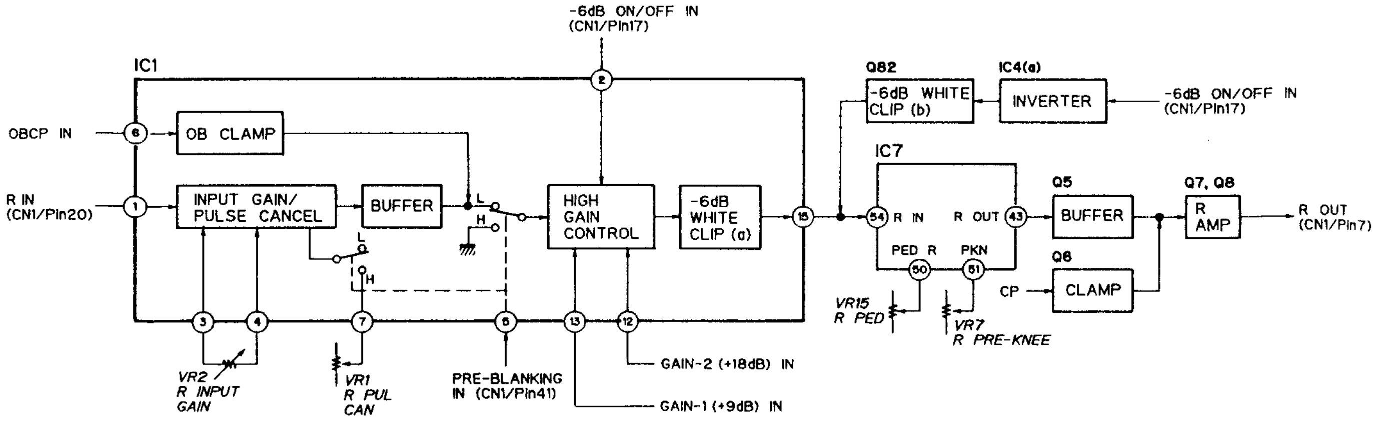

-6dB ON/OFF IN (CN1/Pin17)
IC1
OBCP IN
OB CLAMP
R IN (CN1/Pin20)
INPUT GAIN/ PULSE CANCEL
BUFFER
L
H
HIGH GAIN CONTROL
-6dB WHITE CLIP (a)
VR2 R INPUT GAIN
VR1 R PUL CAN
PRE-BLANKING IN (CN1/Pin41)
GAIN-2 (+18dB) IN
GAIN-1 (+9dB) IN
Q82
-6dB WHITE CLIP (b)
IC4(a)
INVERTER
-6dB ON/OFF IN (CN1/Pin17)
IC7
R IN
R OUT
PED R
PKN
VR15 R PED
VR7 R PRE-KNEE
Q5
BUFFER
Q6
CP
CLAMP
Q7, Q8
R AMP
R OUT (CN1/Pin7)

Fig. 2-7

- o -6dB White Clip Circuit
  When the -6dB ON/OFF switch on the Mother board is set to ON position, white clip DC is supplied through inverter IC4 (a) to white clip circuit (a) and (b) and the high level of the R signal is clipped.
- o R Signal Processing circuit in IC7
  This circuit receives the R signal and controls the R pedestal and R knee levels.
  The R pedestal level is controlled for 40mV by adjusting VR15 (R PED).
  The R knee is controlled by adjusting VR7 (R PRE-KNEE).
  The R signal thus obtained at pin 43 of IC7 is sent through buffer Q5 and amplifier Q7/Q8 to the Sync/Encoder board in order to make a video signal.

3-1-2. G Process Circuit

The G signal obtained at pin 24 of CN1 is fed through pin 1 of IC2 to the following circuit in IC2.

- o Input Gain/Pulse Cancel Circuit
  This circuit controls G signal input gain by adjusting VR4 (G INPUT GAIN) so that the G signal output on the Process/Detail board becomes 0.7V p-p.
  The blanking period of the R signal is detected by pre-blanking signal and the pedestal level of the G signal is controlled by VR3 (G PUL CAN) so that it is not varied while changing the High Gain Selection switch between 0dB and + 18dB position.
- o Optical Black Clamp Circuit
  This circuit keeps constant the optical black clamp DC level of the G signal by suppling the OBCP (optical Black clamp pulse) to this circuit.
- o High Gain Control Circuit
  This circuit controls the level of the G signal by changing the gain of circuit when the camera gain is selected to -6dB, 0dB, + 3dB, + 9dB, + 12dB or + 18dB position by setting the High Gain Selection switch and -6dB ON/OFF switch.
- o -6dB White Clip Circuit
  When the -6dB ON/OFF switch on the Mother board is set to ON position, white clip DC is supplied through inverter IC4 (a) to white clip circuit (a) and (b) and the high level of the G signal is clipped.
- o G Signal Processing circuit in IC7
  This circuit receives the G signal and controls the G pedestal and G knee levels.
  The G pedestal level is controlled for 40mV by adjusting VR16 (G PED).
  The G knee is controlled by adjusting VR8 (G PRE-KNEE).
  The G signal thus obtained at pin 34 of IC7 is sent through buffer Q9 and amplifier Q11/Q12 to the Sync/Encoder board in order to make a video signal.

3-1-3. B Process Circuit

The B signal obtained at pin 28 of CN1 is fed through pin 1 of IC3 to the following circuit in IC3.

- o Input Gain/Pulse Cancel Circuit
  This circuit controls B signal input gain by adjusting VR6 (B INPUT GAIN) so that the B signal output on the Process/Detail board becomes 0.7V p-p.
  The blanking period of the B signal is detected by pre-blanking signal and the pedestal level of the B signal is controlled by VR5 (B PUL CAN) so that it is not varied while changing the High Gain Selection switch between 0dB and + 18dB position.
- o Optical Black Clamp Circuit
  This circuit keeps constant the optical black clamp DC level of the B signal by suppling the OBCP (optical Black clamp pulse) to this circuit.
- o High Gain Control Circuit
  This circuit controls the level of the B signal by changing the gain of circuit when the camera gain is selected to -6dB, 0dB, + 3dB, + 9dB, + 12dB or + 18dB position by setting the High Gain Selection and -6dB ON/OFF switches.
- o -6dB White Clip Circuit
  When the -6dB ON/OFF switch on the Mother board is set to ON position, white clip DC is supplied through inverter IC4 (a) to white clip circuit (a) and (b) and the high level of the B signal is clipped.
- o B Signal Processing circuit in IC7
  This circuit receives the B signal and controls the B pedestal and B knee levels.
  The B pedestal level is controlled for 40mV by adjusting VR17 (B PED).
  The B knee is controlled by adjusting VR9 (B PRE-KNEE).
  The B signal thus obtained at pin 25 of IC7 is sent through buffer Q13 and Q15 to the Matrix circuit in order for color matching signal between two or more color cameras.

3-2. Matrix Circuit

This circuit is a color reproduction fine adjusting circuit for color matching between two or more cameras.

When SW1 (MATRIX ON/OFF SWITCH) is set to the ON position, the differential amplifier consisting of Q18~Q20 works. The R signal is sent from the emitter of Q7 to the base of Q19 and the G signal is fed from the emitter of Q11 to the base of Q18 respectively. Those two signals are mixed each other, and the + (R-G) signal is generated. The + (R-G) signal for the B signal is sent through C38, VR18 (MATRIX LEVEL) and buffer Q20 and mixed with the B signal supplied through VR31 (MATRIX GAIN) and R74. The - B + (R-G) signal (B signal) thus obtained is fed through buffer Q24/Q25 to pin 15 of CN1.

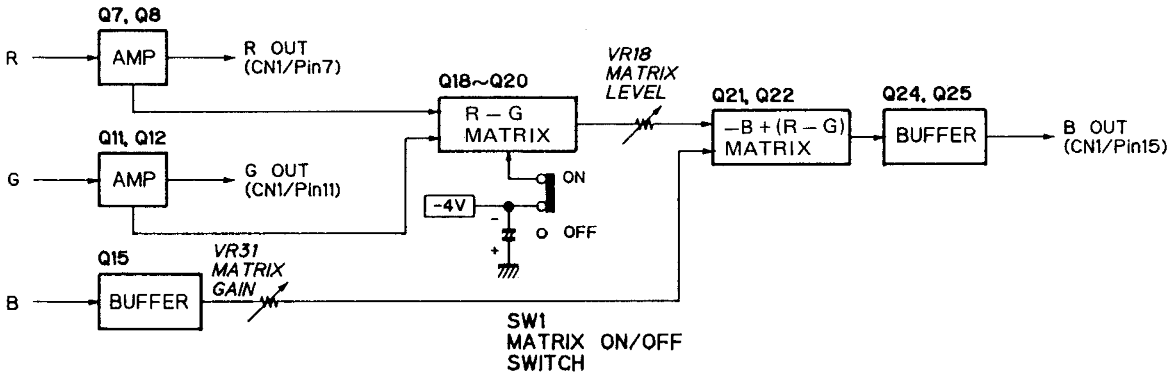


Fig. 3-2 Matrix Circuit

3-3. 1H Detail Delay Circuit

This circuit receives the Y signal and makes the 1H (1 line) - delayed Y signal for making the 2H-delayed Y signal and detail signal.

The Y signal (non-delayed Y signal) is supplied through buffer Q26 to 12.7MHz low pass filter (L.P.F) CF1 and 12.7MHz component is removed. The Y signal is then fed through amplifier Q27/Q28 to the detail generator circuit. On the other hand, the Y signal is sent through clamp Q29 and amplifier Q30 to the gamma correction IC9 where the gamma of Y signal is corrected. The gamma corrected Y signal is then supplied to pin 6 of 1H delay IC10 where the non-delayed Y signal is modulated by 4 fsc signal supplied to pin 11 of IC10. The detected Y signal obtained at pin 3 of IC10 is sent through amplifier consisting of Q38, Q39 and VR20 (1H CCD GAIN) to 10MHz low pass filter CF2 and 1H delayed Y signal is made by removing high frequency component.

The 1H delayed Y signal is fed through buffer Q51 and amplifier Q49 to the gamma correction IC12 where the gamma of 1H-delayed Y signal is corrected again. The gamma corrected 1H-delayed Y signal is then sent to IC13 (a) where the blanking level (BL) of 1H-delayed Y signal is clamped and fixed, and it is fed through amplifier Q65/Q66 to 2H detail delay circuit and detail generator circuits.

3-4. 2H Detail Delay Circuit

This circuit receives 1H-delayed Y signal and makes the 2H (2 line)-delayed Y signal for making the detail signal.

The 1H-delayed Y signal is fed through amplifier Q44/Q45 to pin 6 of 1H delay IC11 where the 1H-delayed Y signal is modulated by 4 fsc signal supplied to pin 11 of IC10 and is delayed more 1H (1 line).

The detected Y signal obtained at pin 3 of IC11 is sent through amplifier consisting of Q40, Q41 and VR21 (2H CCD GAIN) to 10MHz low pass filter (L.P.F) CF4 and 2H-delayed Y signal is made by removing high frequency component. The 2H-delayed Y signal thus made is fed to the detail generator circuit for making the detail signal.

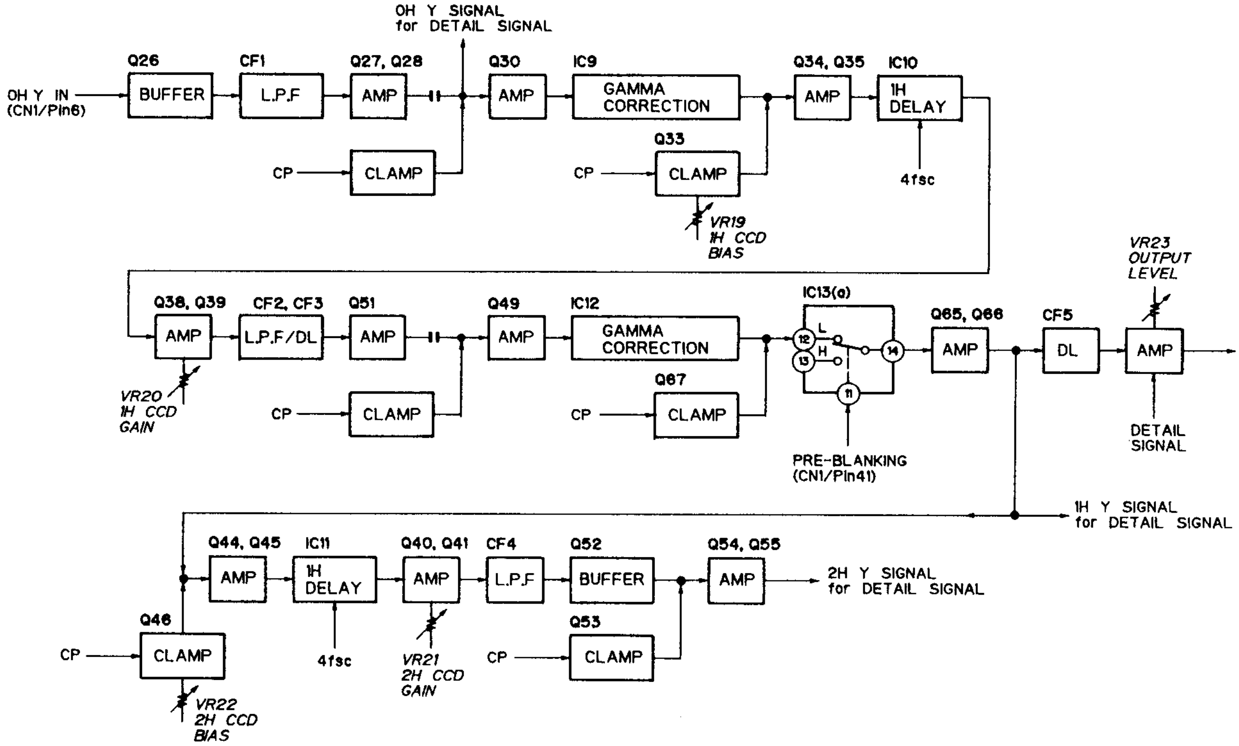

0H Y SIGNAL
for DETAIL SIGNAL
Q26
CF1
Q27, Q28
Q30
IC9
Q34, Q35
IC10
0H Y IN
(CN1/Pin6)
BUFFER
L.P.F
AMP
AMP
GAMMA CORRECTION
AMP
1H DELAY
CP
CLAMP
Q33
CP
CLAMP
4fsc
VR19
1H CCD
BIAS
VR23
OUTPUT
LEVEL
IC13(a)
Q38, Q39
CF2, CF3
Q51
Q49
IC12
Q65, Q66
CF5
AMP
L.P.F/DL
AMP
AMP
GAMMA CORRECTION
L
H
AMP
DL
AMP
Y (1H) OUT
(CN1/Pin3)
VR20
1H CCD
GAIN
CP
CLAMP
Q67
CP
CLAMP
DETAIL
SIGNAL
PRE-BLANKING
(CN1/Pin41)
1H Y SIGNAL
for DETAIL SIGNAL
Q44, Q45
IC11
Q40, Q41
CF4
Q52
Q54, Q55
AMP
1H DELAY
AMP
L.P.F
BUFFER
AMP
2H Y SIGNAL
for DETAIL SIGNAL
Q46
Q53
CP
CLAMP
4fsc
VR21
2H CCD
GAIN
CP
CLAMP
VR22
2H CCD
BIAS

Fig. 3-4 1H and 2H Detail Delay Circuit

3-5. Detail Generator Circuit

This circuit receives non-delayed, 1H-delayed and 2H-delayed Y signals respectively and generates the detail signal as follows.

The block diagram of detail generator circuit is as shown in Fig. 3-5-1.

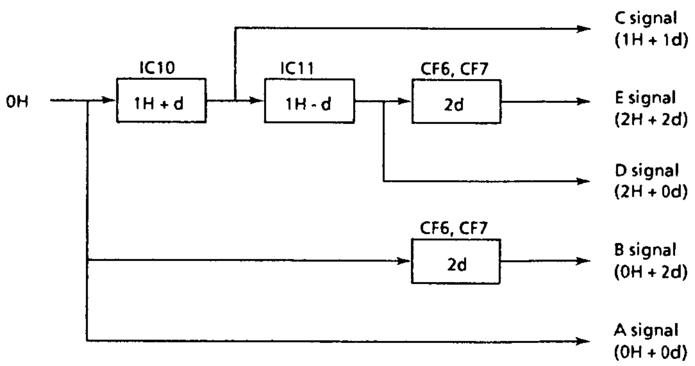

0H
IC10
1H + d
IC11
1H - d
CF6, CF7
2d
CF6, CF7
2d
C signal
(1H + 1d)
E signal
(2H + 2d)
D signal
(2H + 0d)
B signal
(0H + 2d)
A signal
(0H + 0d)

Fig. 3-5-1 Principle Detail Generator

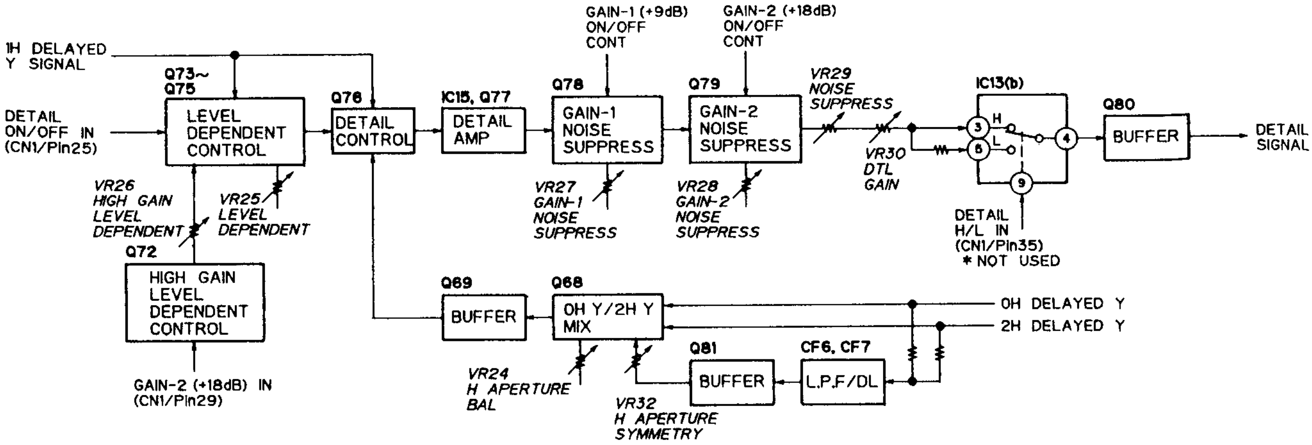

1H DELAYED
Y SIGNAL
GAIN-1 (+9dB)
ON/OFF
CONT
GAIN-2 (+18dB)
ON/OFF
CONT
Q73~
Q75
Q76
IC15, Q77
Q78
Q79
VR29
NOISE
SUPPRESS
IC13(b)
Q80
DETAIL
ON/OFF IN
(CN1/Pin25)
LEVEL DEPENDENT CONTROL
DETAIL CONTROL
DETAIL AMP
GAIN-1 NOISE SUPPRESS
GAIN-2 NOISE SUPPRESS
H
L
BUFFER
DETAIL
SIGNAL
VR30
DTL
GAIN
VR26
HIGH GAIN
LEVEL
DEPENDENT
VR25
LEVEL
DEPENDENT
VR27
GAIN-1
NOISE
SUPPRESS
VR28
GAIN-2
NOISE
SUPPRESS
DETAIL
H/L IN
(CN1/Pin35)
* NOT USED
Q72
HIGH GAIN LEVEL DEPENDENT CONTROL
Q69
Q68
BUFFER
0H Y/2H Y MIX
0H DELAYED Y
2H DELAYED Y
Q81
CF6, CF7
BUFFER
L.P.F/DL
GAIN-2 (+18dB) IN
(CN1/Pin29)
VR24
H APERTURE
BAL
VR32
H APERTURE
SYMMETRY

Fig. 3-5-2 Detail Generator Circuit

o Vertical Detail Signal Generator Equation

$$\begin{aligned} V.AP &= 4C - (A + B + D + E) \\ &= 1H \times 4 - (0H + 0H + 2H + 2H) \end{aligned}$$

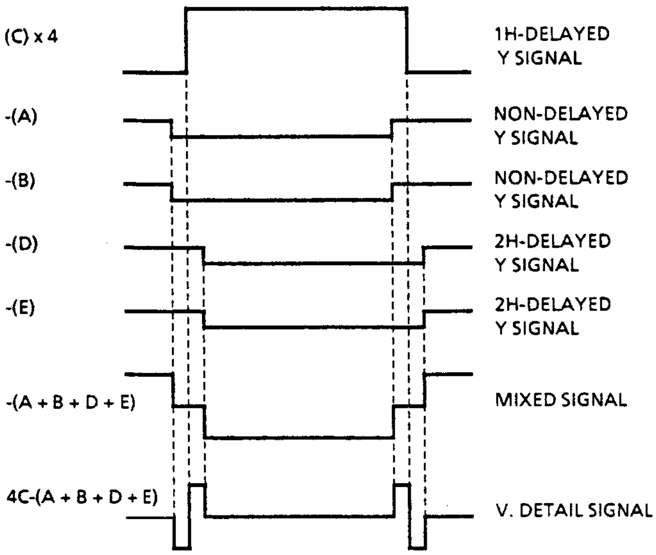

(C) x 4
1H-DELAYED Y SIGNAL
-(A)
NON-DELAYED Y SIGNAL
-(B)
NON-DELAYED Y SIGNAL
-(D)
2H-DELAYED Y SIGNAL
-(E)
2H-DELAYED Y SIGNAL
-(A + B + D + E)
MIXED SIGNAL
4C-(A + B + D + E)
V. DETAIL SIGNAL

Fig. 3-5-3 Vertical Detail Signal

o Howozontal Detail Signal Generator Eqution

$$\begin{aligned} H.AP &= 4C - (A + B + D + E) \\ &= 1d \times 4 - (0d + 2d + 0d + 2d) \end{aligned}$$

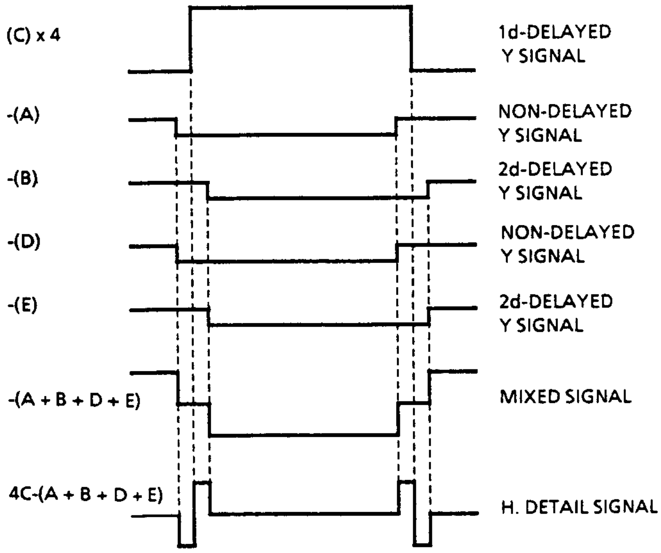

(C) x 4
1d-DELAYED Y SIGNAL
-(A)
NON-DELAYED Y SIGNAL
-(B)
2d-DELAYED Y SIGNAL
-(D)
NON-DELAYED Y SIGNAL
-(E)
2d-DELAYED Y SIGNAL
-(A + B + D + E)
MIXED SIGNAL
4C-(A + B + D + E)
H. DETAIL SIGNAL

Fig. 3-5-4 Horizontal Detail Signal

4. SYNC/ENCODER BOARD

4-1. Encoder Color Bar Generator Circuit

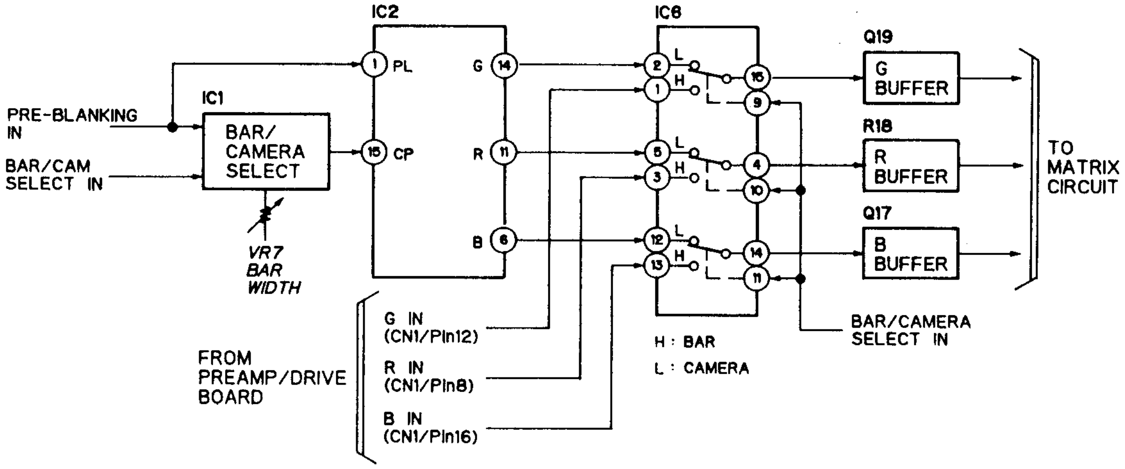


Fig. 4-1 Color Bar Generator Circuit

This circuit consisting of IC1, IC2 and VR7 (BAR WIDTH) generates signals necessary for making full-field color bar signal. The oscillator consisting of IC1(b), IC1(c), R90~R92, VR7 (BAR WIDTH) and C65 is fed to pin 15 of color bar generator IC2 and signals necessary for making EBU color bar signal are generated.

When the Color Bar/Camera Selection Switch is set to the Bar position, the low (L) potential is fed to pin 6 of IC1 (a) and the oscillator works. As a result, R, G and B bar signals are supplied from pins 11, 14 and 6 of IC2 to pins 5, 2 and 12 of the Bar/Camera Selector IC6 respectively. On the other hand, the R, G and B signal picked up by the camera and supplied from the Preamp/Drive board are respectively fed to pins 3, 1 and 13 of IC6.

IC6 selects the bar signals or the camera signals by the potential of the Bar/Camera select signal applied to control terminals (pins 9~11) of IC6:

The selected R, G and B signal obtained at pins 4, 15 and 14 of IC6 are sent through buffers Q18, Q19 and Q17 to the Y, U and V matrix circuits.

4-2. Encoder Y Matrix Circuit

The R, G and B signal selected by analog switch IC6 are respectively sent through resistance-matrix consisting of R108~R112 to the emitter of amplifier Q20 where they are mixed in the fixed proportion and the luminance (Y) signal is made.

The Y signal thus made is sent through buffer Q21 to pin 2 of YC/RGB selector IC7 (a) by the potential of the YC/RGB select signal applied to control terminal (pin 10) of IC7 (a). The Y signal obtained at pin 15 of IC7 (a) is fed through the Y gain control circuit consisting of Q22 and VR8 (Y GAIN) to the encoder balance modulator circuit.

4-3. Encoder U Matrix Circuit

This circuit consisting of Q23~Q26 receives R, G and B signal from the encoder color bar circuit and generates U signal by the following equation.

$$U = 0.89B - 0.3R - 0.59G$$

The B signal is fed to the base of Q23 through VR9 (U WHITE BAL) and R and G signals are fed to the base of Q24. The U signal obtained at the collector of Q24 is fed through Q25 and VR10 (U GAIN) to the encoder balance modulation circuit.

When the Color Bar/Camera Selection switch is set to the Bar position and the Bar/Camera Mod switch SW2 on the Sync/Encoder board to the BAR position, high (H) potential is sent to the base of Q26 and turns it ON. The U gain is controlled by VR10 (U GAIN).

When the Color Bar/Camera Selection switch is set to the Camera position regardless of position of SW2, low (L) potential is supplied to Q26 and the U gain is controlled by VR10 and VR22 (U SUB GAIN).

4-4. Encoder V Matrix Circuit

This circuit consisting of Q28~Q31 receives R,G and B signal from the encoder color bar circuit and generates V signal by the following equation.

$$V = 0.7R - 0.59G - 0.11B$$

The R signal is supplied to the base of Q28 through VR11 (V WHITE BAL) and B and G signals are fed to the base of Q29.

The V signal obtained at the collector of Q29 is sent through Q30 and VR12 (V GAIN) to the encoder balance modulation circuit. When the Color Bar/Camera Selection switch is set to the Camera position regardless of position of SW2, low (L) potential is fed to Q31 and turns it OFF. The V gain is controlled by VR12 (V GAIN) with R141.

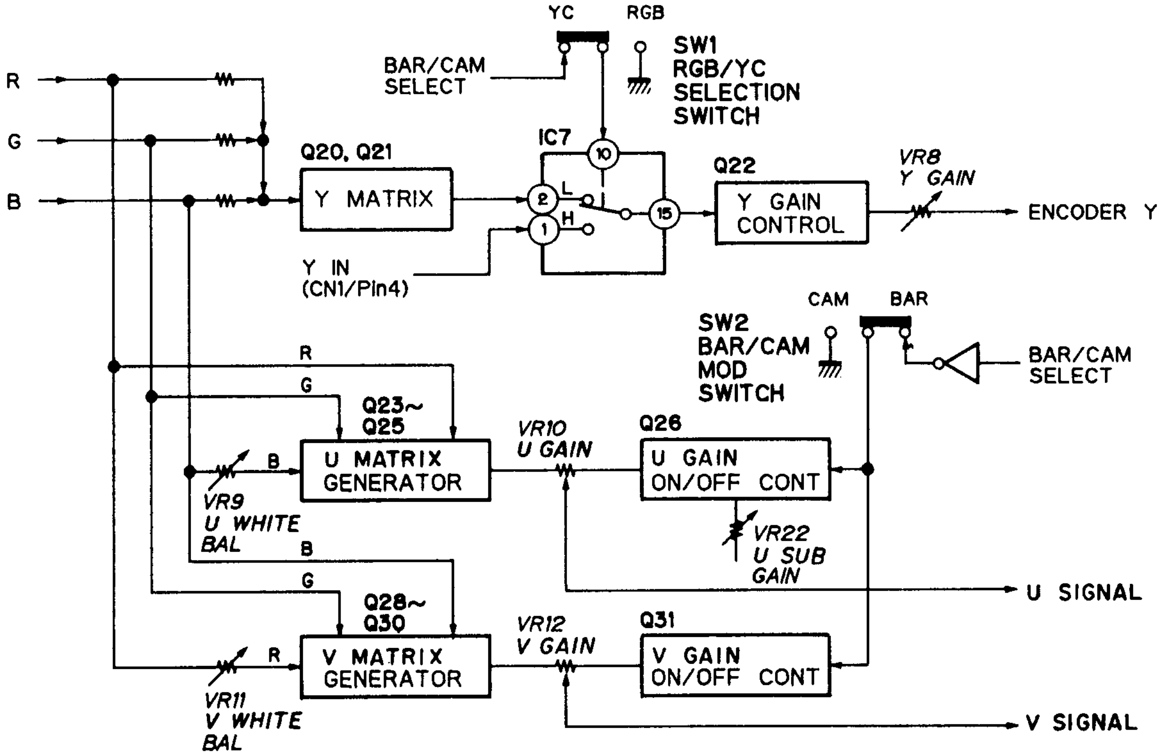

YC
RGB
SW1
RGB/YC
SELECTION
SWITCH
BAR/CAM
SELECT
R
G
B
Q20, Q21
Y MATRIX
IC7
10
2
1
15
L
H
Y IN
(CN1/PIn4)
Q22
Y GAIN
CONTROL
VR8
Y GAIN
ENCODER Y
CAM
BAR
SW2
BAR/CAM
MOD
SWITCH
BAR/CAM
SELECT
Q23~
Q25
U MATRIX
GENERATOR
VR9
U WHITE
BAL
VR10
U GAIN
Q26
U GAIN
ON/OFF CONT
VR22
U SUB
GAIN
U SIGNAL
Q28~
Q30
V MATRIX
GENERATOR
VR11
V WHITE
BAL
VR12
V GAIN
Q31
V GAIN
ON/OFF CONT
V SIGNAL

Fig. 4-2 Encoder Y, U, V Marix Circuit

4-5. Encoder Balance Modulator Circuit

This circuit generates the chrominance (c) signal from the U and V color difference signals.

The V signal from encoder V matrix circuit is fed to clamp circuit in IC8 where the blanking periods of V signal is clamped to the specified DC level. The clamped signal is next supplied to burst flag pulse (BFP) mix circuit to detect burst signal. The burst gain of V signal is adjusted by VR16 (V BURST GAIN) and then supplied to modulation circuit where the clamped V signal is modulated by subcarrier signal for reproducing the V signal.

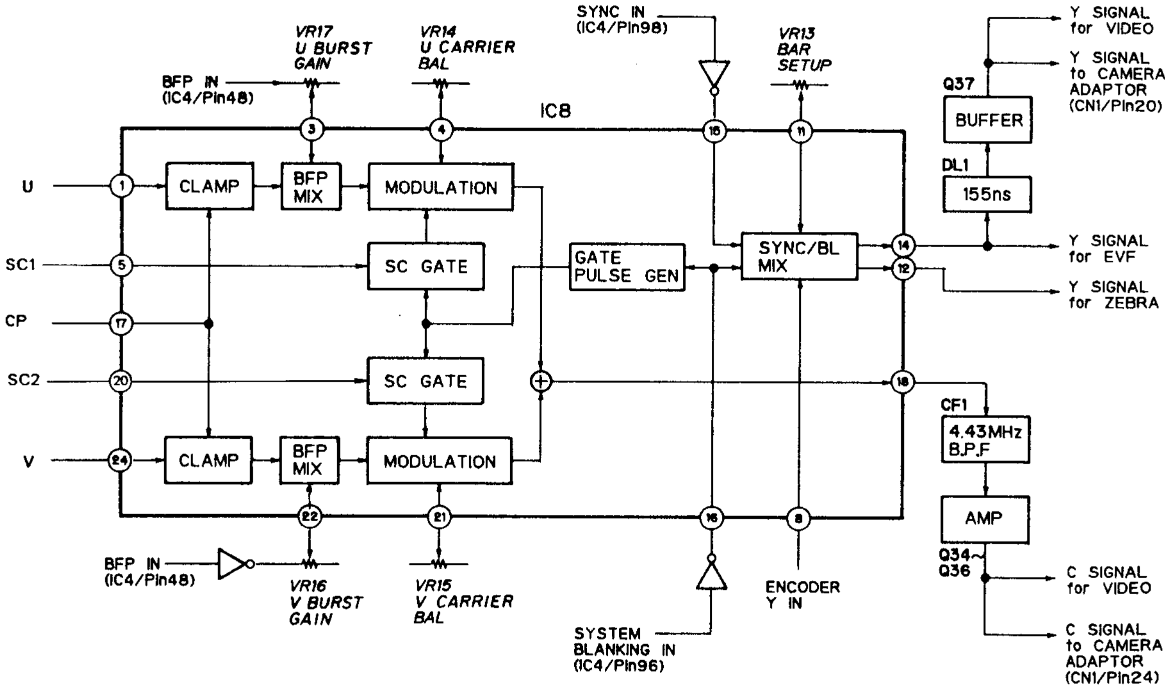
Similarly, the U signal from encoder U matrix circuit is passed through clamp circuit, BFP mix circuit to U modulation circuit for reproducing the B signal.

VR14 (U CARRIER BAL) and VR15 (V CARRIER BAL) adjust the DC level at pins 4 and 21 of IC8 to minimize the carrier leak for the modulators.

The V and U signal thus obtained are mixed to generate chrominance (C) signal, and C signal obtained at pin 18 of IC8 is fed to 4.43MHz band pass filter (B.P.F) CF1 where the chrominance component is only passed through.

The C signal is then sent through amplifier Q34~Q36 to the other circuit and board.

The Y signal obtained at the encoder Y matrix circuit is fed through pin 8 of IC8 to Sync/blanking (BL) mix circuit where the sync signal and blanking signal are mixed with Y signal. The composite thus made Y signal is sent through pins 12 and 14 of IC8 to the other circuit and board.



VR17
U BURST
GAIN
VR14
U CARRIER
BAL
SYNC IN
(IC4/Pin98)
VR13
BAR
SETUP
Y SIGNAL
for VIDEO
Y SIGNAL
to CAMERA
ADAPTOR
(CN1/Pin20)
BFP IN
(IC4/Pin48)
IC8
Q37
BUFFER
DL1
155ns
U
1
3
4
16
11
CLAMP
BFP MIX
MODULATION
SC1
5
SC GATE
GATE
PULSE GEN
SYNC/BL
MIX
14
12
Y SIGNAL
for EVF
Y SIGNAL
for ZEBRA
CP
17
SC2
20
SC GATE
18
CF1
4.43MHz
B.P.F
V
24
CLAMP
BFP MIX
MODULATION
22
21
16
8
AMP
BFP IN
(IC4/Pin48)
VR16
V BURST
GAIN
VR15
V CARRIER
BAL
Q34~
Q36
ENCODER
Y IN
C SIGNAL
for VIDEO
SYSTEM
BLANKING IN
(IC4/Pin96)
C SIGNAL
to CAMERA
ADAPTOR
(CN1/Pin24)

Fig. 4-3 Encoder Balance Modulator Circuit

4-6. Viewfider Signal Process Circuit

This circuit receives Y signal, 1/3 subcarrier (SC) signal and character signal and makes EVF video signal.

The Y signal obtained at pin 12 of IC8 is sent through buffer Q40 to clamp circuit consisting of Q41 and VR19 (ZEBRA LEVEL) where it is clamped with the DC voltage set by VR19 (ZEBRA LEVEL) and then clamped Y signal is fed through amplifier Q42/Q43 to the control terminal (pin 8) of IC9. On the other hand, the Y signal obtained at pin 14 of IC8 is sent to pin 10 of IC9 and 1/3 subcarrrier (SC) signal obtained at pin 50 of IC4 to pin 9 of IC9. When the Y signal exceeds a specified level, pin 8 of analog switch consisting of pin 8~10 of IC9 becomes high (H) potential and 1/3 subcarrier signal is sent out.

When the Y signal does not exceed a specified level, pin 8 of analog switch becomes low (L) potential and Y signal is sent out.

The Y signal with zebra signal thus obtained is fed to another analog switch in IC9 for mixing character signal. The analog switch consisting of pins 5~7 of IC9 receives the Y signal with zebra signal and character signal and its switching is controlled by character blanking signal supplied to pin 7 of IC9.

The signal thus obtained at pin 5 of IC9 is supplied through amplifier Q44/Q45 to pin 3 of EVF Video/Return video selector IC7 (b). On the other hand, the return video from the VTR is supplied through amplifier Q46/Q47 to pin 5 of IC7 (b). The analog switch is controlled by return video control signal supplied from the lens. As a result, the EVF video signal or return video signal is sent through buffer Q48 to the EVF.

4-7. Output Amp Circuit

This circuit receives luminance (Y) signal and chrominance (c) signal and makes composite video signal.

The Y signal with the sync signal obtained at encoder balance modulator circuit is fed to the base of Q53 and C signal with the burst signal is fed to the emitter of Q54, and then they are mixed for making the composite video signal. The composite video signal thus obtained at the collector of Q54 is supplied through buffer Q55 to amplifier IC10.

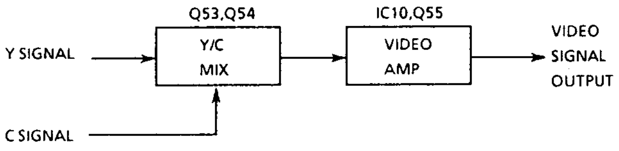

Q53,Q54
Y/C
MIX
IC10,Q55
VIDEO
AMP
Y SIGNAL
C SIGNAL
VIDEO
SIGNAL
OUTPUT

Fig. 4-5 Output Amp Circuit

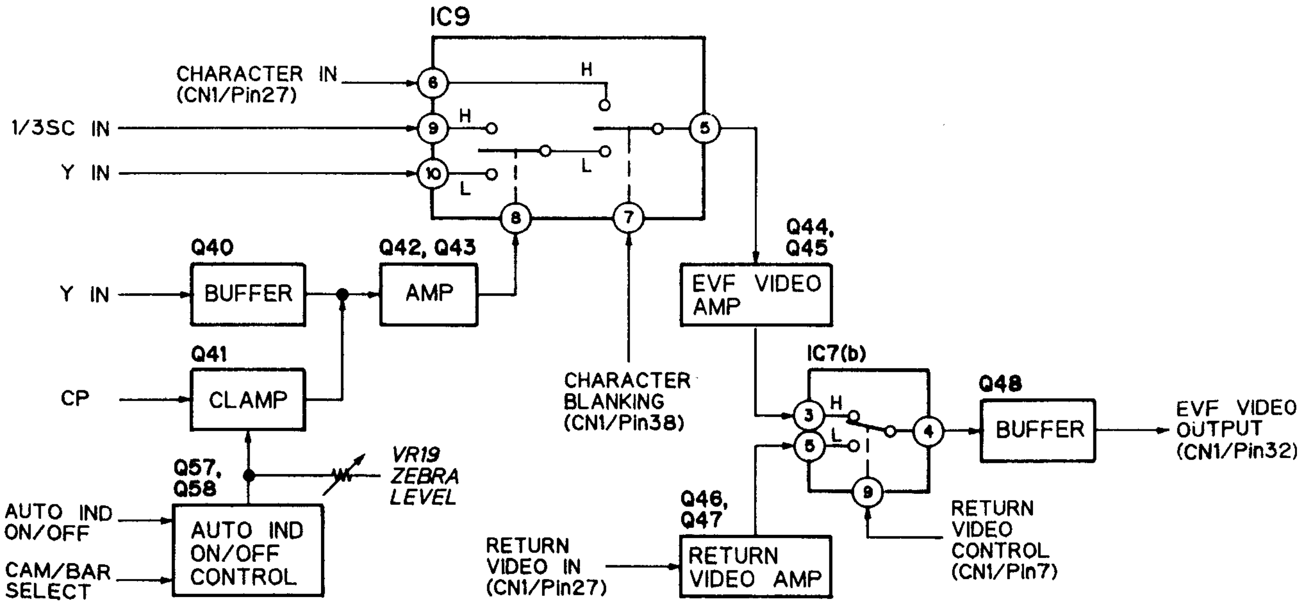

IC9
CHARACTER IN
(CN1/Pin27)
1/3SC IN
Y IN
H
L
6
9
10
8
7
5
Q40
BUFFER
Q42, Q43
AMP
Y IN
Q41
CLAMP
CP
Q57,
Q58
VR19
ZEBRA
LEVEL
AUTO IND
ON/OFF
CAM/BAR
SELECT
AUTO IND
ON/OFF
CONTROL
CHARACTER
BLANKING
(CN1/Pin38)
Q44,
Q45
EVF VIDEO
AMP
IC7(b)
3
5
4
9
Q48
BUFFER
EVF VIDEO
OUTPUT
(CN1/Pin32)
Q46,
Q47
RETURN
VIDEO AMP
RETURN
VIDEO IN
(CN1/Pin27)
RETURN
VIDEO
CONTROL
(CN1/Pin7)

Fig. 4-4 Viewfinder Signal Process Circuit

4-8. Gen-Lock Sync Separation Circuit

This circuit receives the black burst signal or color signal supplied to the gen-lock input connector on the rear of camera, and separates the sync and burst signal from the gen-lock signal. The separated sync and burst signal is fed to the sync generator IC 4 for the gen-lock/external sync mode.

The gen-lock signal is sent through pin 28 of CN1, buffer Q1 and amplifier Q2/Q3 to sync separator Q5/Q6, and the separated sync signal is then fed through buffer Q6 and inverter IC3(b)/(c) to pin 7 of IC4. When it is fed to pin 7 of IC4, the sync generator IC4 is converted into the gen-lock/external sync mode and pulses which are synchronized with the separated sync signal is generated.

The sync signal which is separated from the gen-lock signal is sent to integrator consisting of R17~R18, C11 and C12 to remove the horizontal component. The vertical (V) component thus detected is fed through inverter Q7 and IC3(a) to pin 62 of IC4 to reset it vertically.

As a result, sync generator generates V pulses which are synchronized with the V component of the gen-lock signal.

The gen-lock signal is also sent to burst gate circuit consisting of Q8~Q13 and IC3 (d). The gen-lock signal is sent through buffer Q8 to burst gate Q9 where the burst signal is detected by the burst gate pulse supplied to the base of Q9 from pin 49 of IC4. The detected burst signal is fed through amplifier Q10~Q12 and inverter Q13/IC3 (d) to pin 43 of IC4, and the sync generator generates the subcarrier (SC) signal which is synchronized with the detected burst signal.

4-9. Sync Generator Circuit

This circuit receives the 17.7MHz signal in internal sync mode or external sync mode and generates all sync signals used in the camera.

The pin identification of sync generator IC4 is as follws.

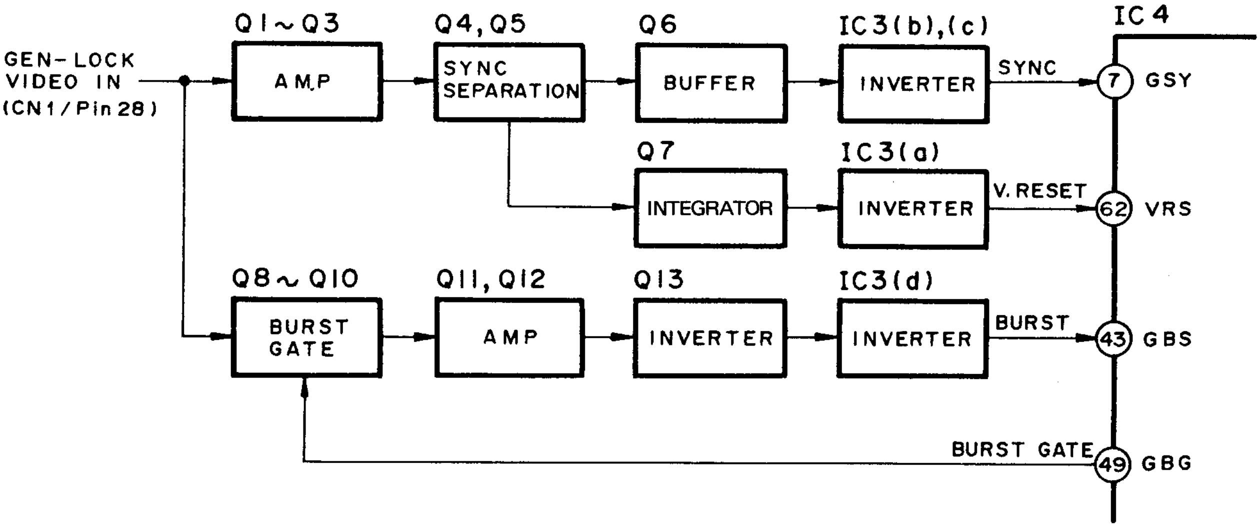

GEN-LOCK VIDEO IN (CN1/Pin 28)
Q1~Q3
AMP
Q4,Q5
SYNC SEPARATION
Q6
BUFFER
IC3(b),(c)
INVERTER
SYNC
IC 4
7
GSY
Q7
INTEGRATOR
IC3(a)
INVERTER
V. RESET
62
VRS
Q8~Q10
BURST GATE
Q11,Q12
AMP
Q13
INVERTER
IC3(d)
INVERTER
BURST
43
GBS
BURST GATE
49
GBG

Fig. 4-6 Gen-Lock Sync Separation Circuit

MB87075A

SYNC LSI

Pin Identification

Pin No.	Name	In/Out	Description
1	GLC		
2	VB1	-	Not Used
3	VDD1	In	+ 5V DC Power
4	GIE	-	Not Used
5	NP	-	Not Used
6	IEO	Out	Internal/External mode Output
7	GSY	In	Gen-lock Sync Input
8	VDD1	In	+ 5V DC Power Input
9	VSS1	-	Ground
10	TST1	-	Not Used
11	TST2	-	Not Used
12	TST3	-	Not Used
13	TST4	-	Not Used
14	VSS1	-	Ground
15	EBI	-	Not Used
16	PBI	-	Not Used
17	EBO	-	Not Used
18	PBO	-	Not Used
19	GSE	-	Not Used
20	VSS2	-	Ground
21	VDD2	In	+ 5V DC Power
22	SPD	Out	Phase Detect Output for SC
23	SVI	In	External 17.7MHz Input
24	SVO	Out	External 17.7MHz Output
25	OSI	In	Internal 17.7MHz Input
26	OSO	Out	Internal 17.7MHz Output
27	VSS2	-	Ground
28	VDD3	In	+ 5V DC Power
29	GSC	In	SC Phase
30	VSS2	-	Ground
31	VDD4	In	-5DC Power
32	S2C	In	Color Bar Phase-1 Control
33	VSS4	-	Ground
34	VDD5	In	+ 5V DC Power
35	S1C	In	Color Bar Phase-2 Control
36	VSS5	-	Ground
37	VDD6	In	+ 5V DC Power
38	P2C	-	Not Used
39	VSS6	-	Ground
40	VDD1	In	+ 5V DC Power
41	GC2	In	External Sub carrier Phase Control-2
42	GC1	In	External Subcarrier Phase Control-1
43	GBS	In	Gen-lock Burst Input
44	SHC	In	Subcarrier Phase Control
45	SC1	Out	Subcarrier-1 Pulse
46	SC2	Out	Subcarrier-2 Pulse
47	PSQ	-	Not Used
48	BFP	Out	Burst Flag Pulse
49	GBG	Out	Burst Gate Pulse
50	ZBR	Out	1/3 Subcarrier Signal
51	BSC	-	Not Used
52	VSS1	-	Ground
53	VDD1	In	+ 5V DC Power
54	ALX	-	Not Used
55	AL1	-	Not Used
56	ALC	Out	ALC Gate Pulse
57	FLM	Out	Color Frame Pulse
58	VDR	Out	Vertical Drive Pulse
59	VST	Out	Vertical Start Pulse
60	VBL	Out	Vertical Blanking Pulse
61	VIS	-	Not Used
62	VRS	In	V Reset Input
63	HB1	-	Not Used
64	VDD1	Om	+ 5V DC Power
65	VSS1	-	Ground
66	HB2	-	Not Used
67	HRS	-	Not Used
68	HD	Pit	Horizontal Drive pulse
69	CP	Out	Clamp pulse
70	HWS	-	Not Used
71	FH	-	Not Used
72	BCP	-	Not Used
73	VSS1	-	Ground
74	VDD1	In	+ 5V DC Power
75	HPE	-	Not Used
76	GPE	-	Not Used
77	VSS7	-	Ground
78	VDD7	In	+ 5V DC Power
79	HPC	-	Not Used
80	VSS8	-	Ground
81	VDD8	In	+ 5V DC Power
82	GPC	In	Gen-Lock H Phase DC
83	VSS9	-	Ground
84	VDD9	In	+ 5V DC Power
85	HPI	In	VCO for H Lock Input
86	HPO	Out	VCO for H Lock Output
87	HPD	Out	Phase Detect for H Lock
88	PVI	In	
89	PVO	-	Not Used
90	PVD	Out	
91	LTP	-	Not Used
92	VDD1	In	+ 5V DC Power
93	VSS1	-	Ground
94	VWS	-	Not Used
95	CVS	-	Not Used
96	CSB	Out	Composite System Blanking Pulse
97	CPB	Out	Composite Pre Blanking Pulse
98	CSY	Out	Composite Sync Pulse
99	VSS1	-	Ground
100	VB2	-	Not Used

5. POWER/AUTO BOARD

5-1. + 9.2V/ + 15.5V Regulator Circuit

This circuit generates regulated +9.2V DC and +15.5V DC from unregulated +12V DC power by using switching pulse generated inside IC11 and they are supplied to other circuits. The voltage fluctuation of +9.2V DC and +15.5V DC are supplied through pins 14 and 3 to respective error amplifiers inside IC11, where they are compared with reference voltage. The compared signals are then supplied to comparator, where they are compared with triangle pulse supplied through pin 1. As a result, width of switching pulses come out from pins 10 and 7 are controlled so that both +9.2V DC and +15.5V DC are kept constant.

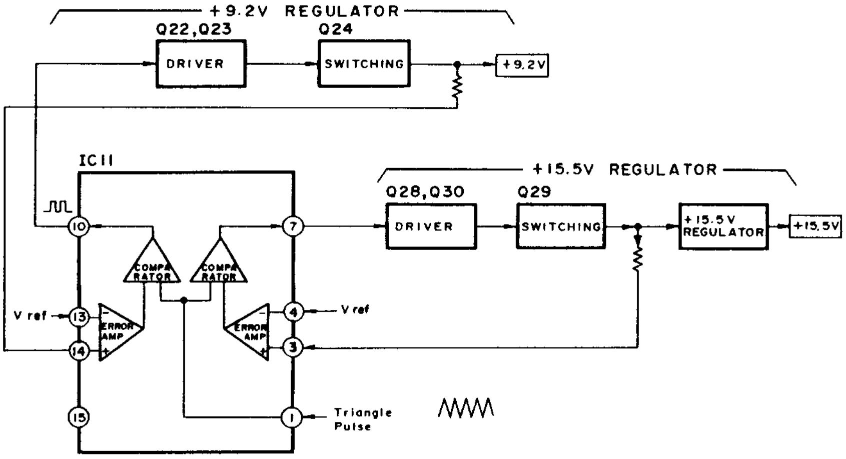

+9.2V REGULATOR
Q22,Q23
Q24
DRIVER
SWITCHING
+9.2V
IC11
+15.5V REGULATOR
Q28,Q30
Q29
DRIVER
SWITCHING
+15.5V REGULATOR
+15.5V
COMPARATOR
COMPARATOR
V ref
ERROR AMP
ERROR AMP
V ref
Triangle Pulse
10
7
13
14
15
4
3
1

Fig. 5-1-1 + 9.2V / + 15.5V Regulator Circuit

5-2. + 5V/-8.3V Regulator Circuit

This circuit generates regulated +5V DC and -8.3V DC from unregulated +12V DC power by using switching pulse generated inside IC12 and they are supplied to other circuits. The voltage fluctuation of +5V DC and +8.3V DC are supplied through pins 14 and 4 to respective error amplifiers inside IC12, where they are compared with reference voltage set by VR3. The compared signals are then supplied to comparator, where they are compared with triangle pulse. As a result, width of switching pulses come out from pins 10 and 7 are controlled so that both +5V DC and -8.3V DC are kept constant.

o Triangle OSC Synchronizer

Triangle pulse is synchronized with clamp pulse supplied from pin 46 of CN1 by adjusting VR4.

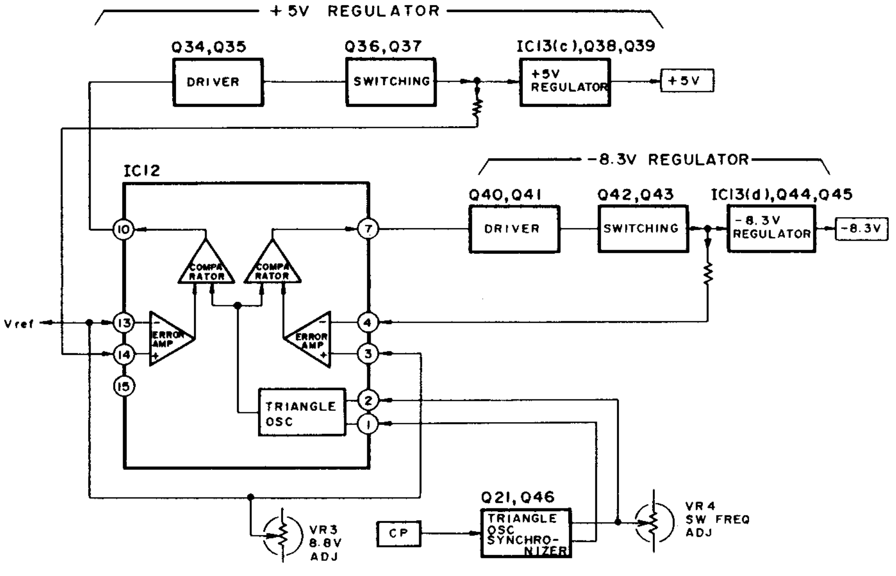

+5V REGULATOR
Q34,Q35
Q36,Q37
IC13(c),Q38,Q39
DRIVER
SWITCHING
+5V REGULATOR
+5V
IC12
-8.3V REGULATOR
Q40,Q41
Q42,Q43
IC13(d),Q44,Q45
DRIVER
SWITCHING
-8.3V REGULATOR
-8.3V
COMPARATOR
COMPARATOR
Vref
ERROR AMP
ERROR AMP
TRIANGLE OSC
10
7
13
14
15
4
3
2
1
Q21,Q46
TRIANGLE OSC SYNCHRONIZER
CP
VR3 8.8V ADJ
VR4 SW FREQ ADJ

Fig. 5-2-1 + 5V / -8.3V Regulator Circuit

5-3. + 8.8V Regulator Circuit

This circuit consisting of IC13 (a), Q26, Q27 generate + 8.8V DC from unregulated + 12V DC power, and it is supplied to other circuit.

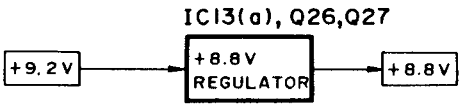

IC13(a), Q26,Q27
+9.2V
+8.8V
REGULATOR
+8.8V

Fig. 5-3-1 + 8.8V Regulator Circuit

5-4. Standby Cont Circuit

When Power Switch of camera is set to save mode, standby cont signal is supplied through standby cont Q17, Q18 and protect inhibit Q19 to pin 15 of IC11, and IC11 becomes inactive mode. As a result, + 9.2V DC, + 8.8V DC and + 15.5V Regulator circuits stop.

On the other hand, standby cont signal is supplied through Q17, 18 and Q20 to pin 15 of IC12 and IC12 becomes inactive mode.

As a result, + 5V DC and + 8.3V DC regulator circuits stop.

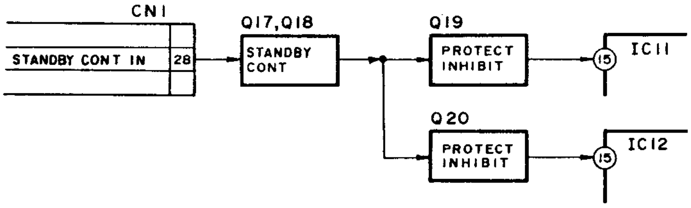

CN1
STANDBY CONT IN
28
Q17,Q18
STANDBY
CONT
Q19
PROTECT
INHIBIT
15
IC11
Q20
PROTECT
INHIBIT
15
IC12

Fig. 5-4-1 Standby Control Circuit

5-5. + 9.2V Short Detect Circuit

When + 9.2V line becomes short condition by some accident, H level is supplied to pin 15 of IC11, and IC11 becomes inactive mode.

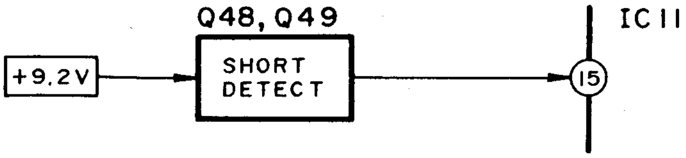

Q48, Q49
+9.2V
SHORT
DETECT
15
IC11

Fig. 5-5-1 + 9.2V Short Detect Circuit

5-6. + 5V/-8.3V Short Detect Circuit

When + 5V/ or 8.3V line becomes short condition by some accident, H level obtained at emitter of Q50 or Q52 is supplied to pin 15 of switch cont IC12 to make it inactive mode.

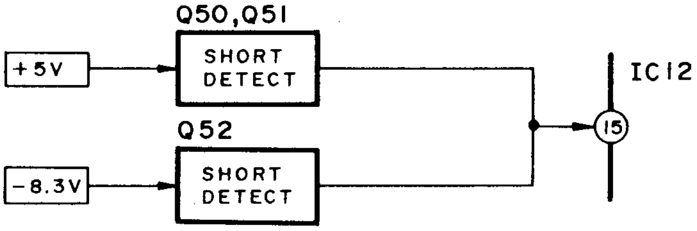

Q50,Q51
+5V
SHORT
DETECT
IC12
Q52
−8.3V
SHORT
DETECT
15

Fig. 5-6-1 + 5V / -8.3V Short Detect Circuit

5-7. CPU Circuit

5-7-1. CPU

The pin identifications and functions of CPU IC1 is described in the Table.

IC1 (YWD75108GE48)
Pin identification.

Pin No.	Name	In/Out	Description
1	P41	Out	R/B Gain & Ped
2	P40	Out	R/B Gain & Ped
3	P53	Out	R/B Gain & Ped
4	P52	Out	R/B Gain & Ped
5	P51	Out	R/B Gain & Ped
6	P50	Out	R/B Gain & Ped
7	RESET	In	Reset Cont
8	x2	Out	Clock PUlse Genarator (4.19MHz)
9	x1	In	Clock Pulse Genarator (4.19MHz)
10	P63	Out	E^2 PROM CS
11	P62	Out	E^2 PROM Clock
12	P61	In/Out	ABC Busy
13	P60	In/Out	AWC Busy
14	P73	Out	Inbit
15	P72	Out	D/A Converter Control
16	P71	Out	D/A Converter Control
17	P70	Out	D/A Converter Control
18	P83	In	AWC & ABC Mode Switch
19	P82	In	A/S Converter
20	P81	In	AWC Comparator H/L
21	P80	In	ABC Comparator H/L
22	P93	Out	RB/G Select
23	P92	Out	R/B Select
24	P91	Out	ABC RB/G Select
25	P90	Out	AWC Hold Reset
26	VSS	-	Not Used
27	P13/INT3	-	Camera/RCU
28	P12/INT2	-	E^2 PROM Reset
29	P11/INT1	-	Auto Reset
30	P10/INT0	In	Power OFF
31	PTH03	-	Not Used
32	PTH02	In	+5V
33	PTH01	-	Not Used
34	PTH00	In	AWC A/B/Preset Select
35	TI0	In	VTR start/stop
36	TI1	In	V. BL
37	P23	Out	Auto Indicator
38	P22/PCL	Out	Battery Warining
39	P21/PT01	Out	Character Gen Store
40	P20/PT00	Out	E^2 PROM Data
41	P03/SI	In	E^2 PROM Data
42	P02/SO	Out	Character Data
43	P01/SCK	Out	Character Serial Clock
44	P00/INT4	In	Not Used
45	P123	In	Bar/Camera Select
46	P122	In	Rec Tally Control
47	P121	In	Tec Time Reset
48	P120	In	Check ON/OFF
49	P133	In	-6dB ON/OFF
50	P132	-	Not Used
51	P131	-	Not Used
52	P130	-	Not Used
53	P143	-	Not Used
54	P142	In	Detail ON/OFF
55	P141	In	Not Used
56	P140	-	Not Used
57	NC	-	+5V
58	VDD	In	+5V
59	P33	In/Out	Shutter-2 ON/OFF
60	P32	In/Out	Shutter-1 ON/OFF
61	P31	In/Out	Gain-2 (+18dB) ON/OFF
62	P30	In/Out	Gain-1 (+9dB) ON/OFF
63	P43	Out	R/B Gain & Ped
64	P42	Out	R/B Gain & Ped

5-7-2. Reset Control Circuit

When turn on the Power, +5V DC is supplied to base of Reset Cont Q5, and negative Pulse comes out from collector of Q5 is supplied to pin 7 of IC1 to reset the program of CPU IC1.

5-7-3. Power OFF Detect Circuit

During operating mode, pin 5 of IC10 is set to high(H) level. When power is turned OFF, potential of pin 5 of IC10 changes to low(L) level, which is supplied to pin 30 of IC1 to inform that power is turned OFF.

5-7-4. Back-UP Memory Circuit

When CPU IC1 receives low(L) level through pin 30, informations such as AWC, ABC and REC TIME memorized inside IC1 are moved through pin 40 of IC1 to back-up memory IC9 through pin 5.

5-7-5. Battery Warning OutPut Circuit

When DC Power supplied to the camera goes down to 10.6V, battery warning Pulse comes out from pin 38 of I C1 is supplied through Batt Warning Output Q11 to electronic viewfinder to blink the Battery Warning Indicator.

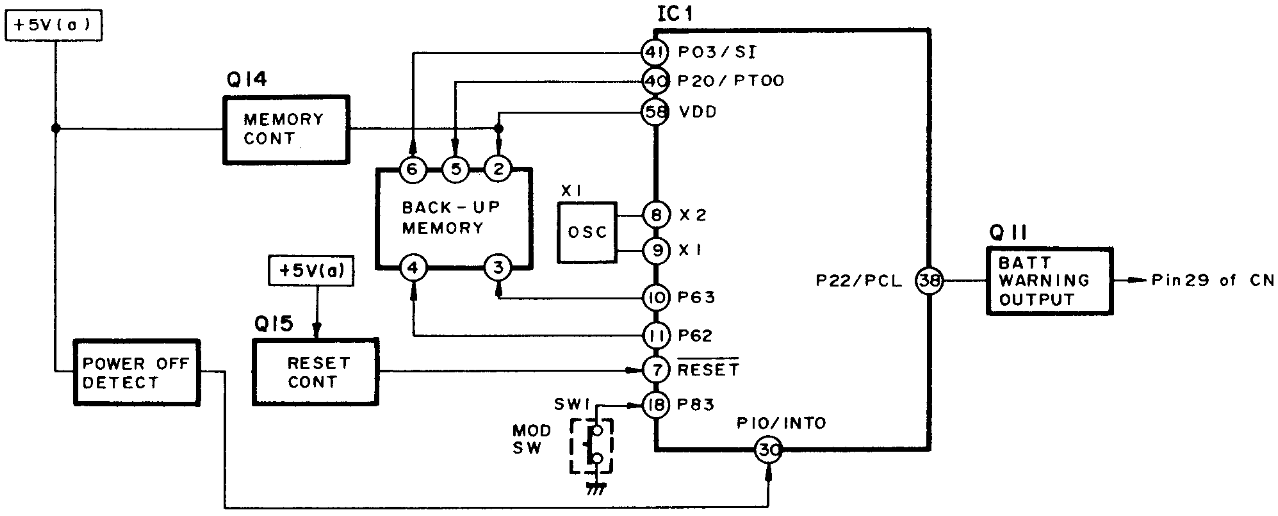

+5V(a)
Q14
MEMORY CONT
IC1
41 P03/SI
40 P20/PT00
58 VDD
6
5
2
BACK-UP MEMORY
4
3
X1
OSC
8 X2
9 X1
10 P63
11 P62
+5V(a)
Q15
RESET CONT
7 RESET
POWER OFF DETECT
SW1
18 P83
MOD SW
P10/INT0
30
P22/PCL
38
Q11
BATT WARNING OUTPUT
Pin29 of CN

Fig. 5-7 CPU Circuit

5-8. Character Generator

The CPU IC1 receives informations for character display from other circuits and character informations obtained at pin 42 of IC1 is supplied to pin 1 of character generator IC8. The character signal corresponding to character information is obtained at pin 11 and supplied to Sync/Encoder board in order to mix with video signal.

The clock pulse frequency of IC8 is adjusted by CT1 (CHARACTER POSITION).

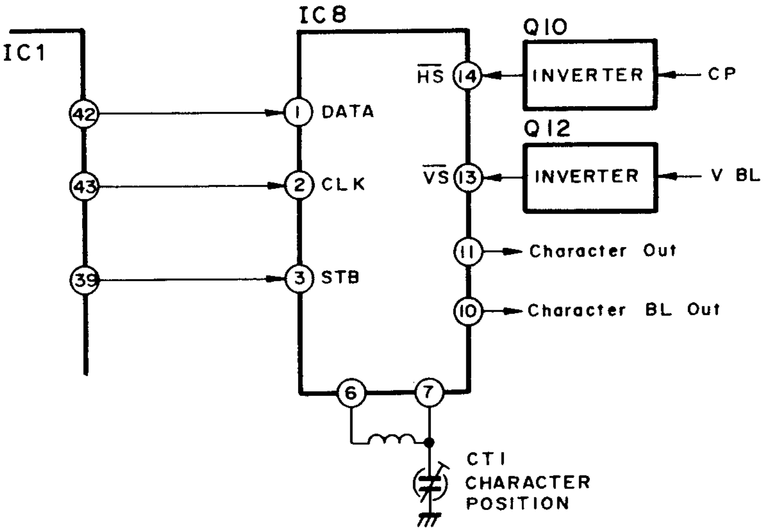

IC1
42
43
39
IC8
1 DATA
2 CLK
3 STB
HS 14
VS 13
Q10
INVERTER
CP
Q12
INVERTER
V BL
11 Character Out
10 Character BL Out
6
7
CT1
CHARACTER POSITION

Fig. 5-8 Character Generator Circuit

5-9. D/A, Demultiplex Circuit

5-9-1. AWC Control

R and B signals are compared with G signal by AWC cont IC7 (b). If the B signal is higher than G signal, the output obtained at pin 1 of IC7 (b) becomes low (L) and supplied to pin 20 of CPU IC1. IC1 instructs the count down digital code to D/A converter Z1 for decreasing B gain, and output obtained at Pin 10 of Z1 is then supplied through buffer IC5 (a), pins 3 and 14 of IC2 and B gain DC output IC3 (b) to Pin 19 of CN1.

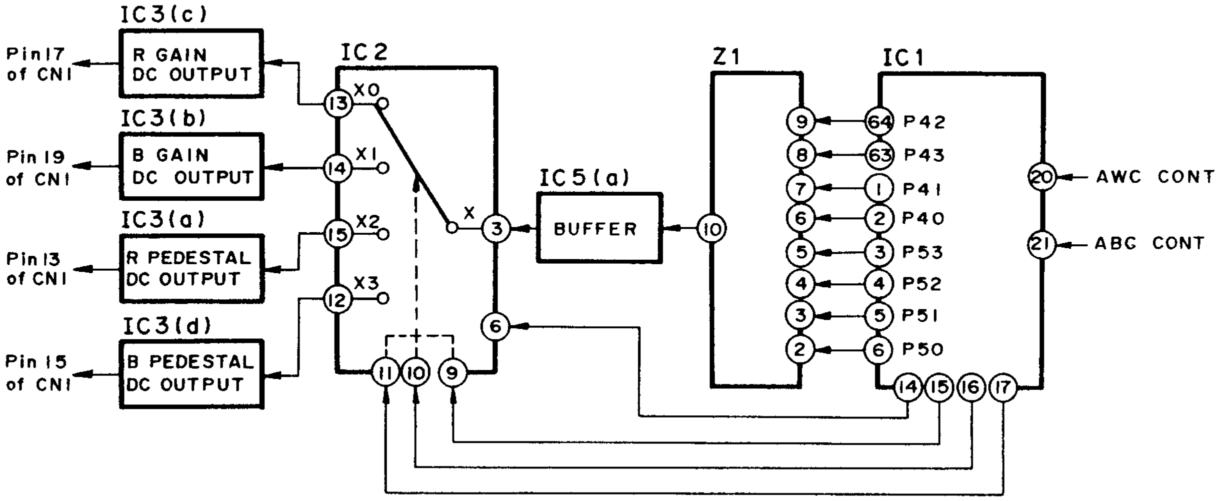
If the B signal is lower than G signal, the output obtained at pin 1 of IC7 (b) becomes high (H) and supplied to pin 20 of IC1. IC1 instructs the count up digital code to D/A converter Z1 for increasing B signal. The R gain is also controlled as in the similar way. The adjustment for B and R gains are alternately carried out.

5-9-2. ABC Control

R and B signals are compared with G signal by ABC cont IC7 (d). If the B signal is higher than G signal, the output obtained at pin 2 of IC7 (d) becomes low (L) and supplied to pin 21 of CPU IC1. IC1 instructs the count down digital code D/A converter Z1 for decreasing B Pedestal and output obtained at pin 10 of Z1 is then supplied through buffer IC5 (a), pins 3 and 12 of IC2 and B pedestal DC output IC3 (d) to pin 15 of CN1.

If the B signal is lower than G signal, the output obtained at pin 2 of IC7 (d) becomes high (H) and supplied to pin 20 of IC1. IC1 instructs the count up digital code to D/A converter Z1 for increasing B Pedestal and output obtained at pin 10 of Z1 is then supplied through IC5(a), pins 3 and 12 of IC 2 and IC 3 (d) to pin 15 of CN1.

The R Pedestal is also controlled as in the similar way. The adjustment for B and R Pedestals are alternately carried out.


IC3(c)
Pin17 of CN1
R GAIN DC OUTPUT
IC3(b)
Pin 19 of CN1
B GAIN DC OUTPUT
IC3(a)
Pin 13 of CN1
R PEDESTAL DC OUTPUT
IC3(d)
Pin 15 of CN1
B PEDESTAL DC OUTPUT
IC2
X0
X1
X2
X3
X
13
14
15
12
3
6
11
10
9
IC5(a)
BUFFER
Z1
10
9
8
7
6
5
4
3
2
IC1
64 P42
63 P43
1 P41
2 P40
3 P53
4 P52
5 P51
6 P50
14
15
16
17
20
21
AWC CONT
ABC CONT

INPUT			CONNECTION
Pin 9	Pin 10	Pin 11	
L	L	L	⑬ —— ③
L	L	H	⑭ —— ③
L	H	L	⑮ —— ③
L	H	H	⑫ —— ③

Fig. 5-9 D/A, De-multiplex Circuit

5-10. AWC Circuit

This circuit automatically sets the Peak levels of R and B signals for matching them with the Peak level of G signal by utilizing analog switch IC6, AWC cont IC7(b) and CPU IC1.
R or B signal selected by IC6 is obtained at pin 4 of IC6, and peak level of R or B signals is held by R/B peak hold Q7.
The peak level of R or B signal is supplied to AWC cont IC7.
On the other, G signal selected by IC6 is obtained at pin 14 of IC6. and peak level of G signal is held by G peak hold Q6. The peak level of G signal is also supplied to IC7(b), where peak levels of R/B and G signals are compared, and the compared signal is sent to pin 20 of IC1.
After comparing them, peak levels of R, G and B signals held by Q6 and Q7 are discharged by R/B charge reset Q9 and G chargereset Q8.

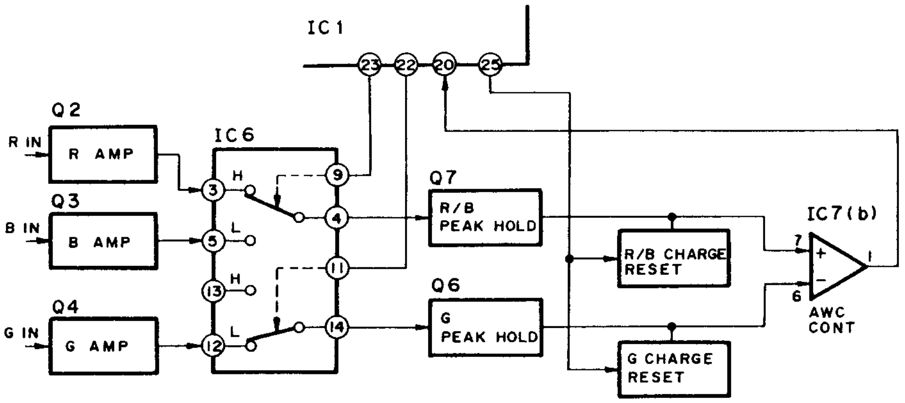

IC 1
23
22
20
25
Q2
R IN
R AMP
Q3
B IN
B AMP
Q4
G IN
G AMP
IC6
H
L
3
5
13
12
9
4
11
14
Q7
R/B PEAK HOLD
Q6
G PEAK HOLD
R/B CHARGE RESET
G CHARGE RESET
IC7(b)
7
6
1
+
−
AWC CONT

Fig. 5-10 AWC Circuit

5-11. ABC Circuit

This circuit automatically set the pedestal levels of R and B signals for matching them with the pedestal level of G signal by utilizing analog Switch IC6, ABC cont IC7 (d) and CPU IC1.
R or B pedestal level selected by IC6 is obtained at pin 4 of IC6 and supplied to pin 13 of IC6. R/B pedestal levels supplied to pin 13 and G pedestal level supplied to pin 12 selected alternately by control signal from pin 11 is obtained at pin 14 and supplied to pin 15 through buffer Q5. G and R/B pedestal levels obtained at pins 1 and 2 alternately by control signal from pin 10 are supplied to ABC cont IC7(d), where G and R/B pedestal level are compared and compared signal obtained at pin 2 of IC7(d) is supplied to pin 22 of IC1.

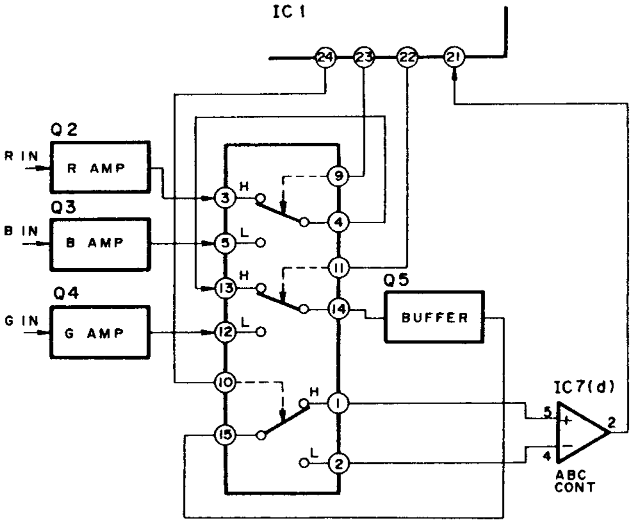
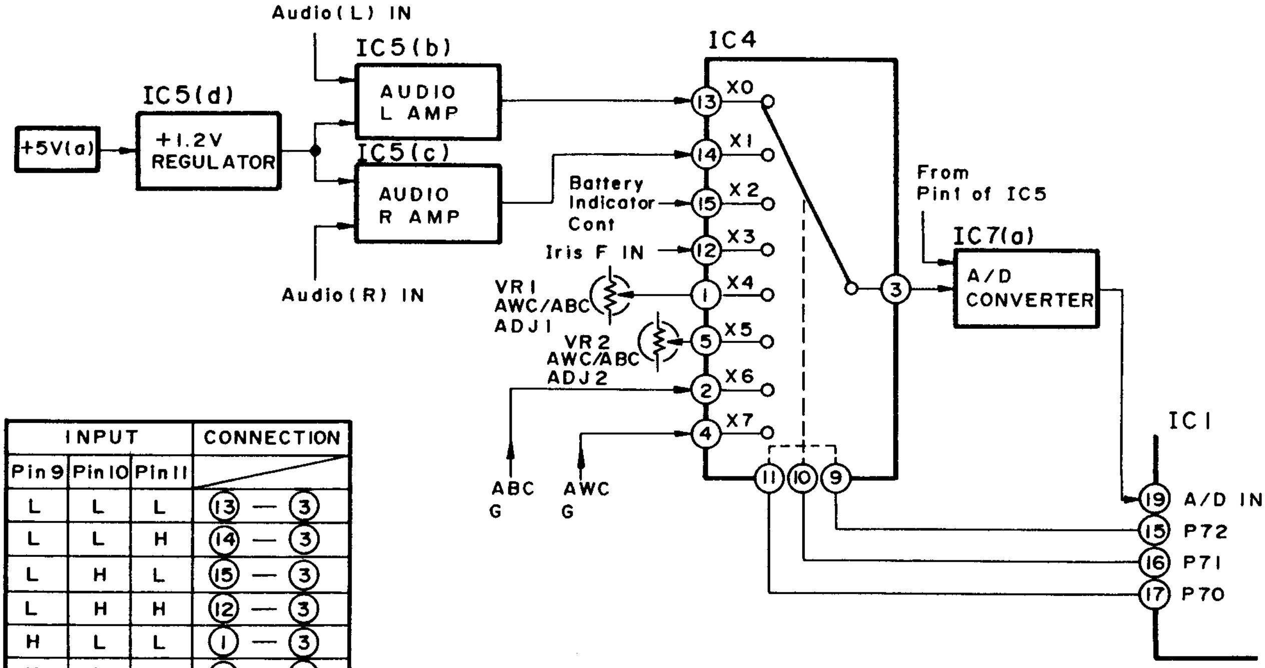

IC 1
24
23
22
21
Q2
R IN
R AMP
Q3
B IN
B AMP
Q4
G IN
G AMP
H
L
3
5
13
12
10
15
9
4
11
14
1
2
Q5
BUFFER
IC7(d)
5
4
2
+
−
ABC CONT

Fig. 5-11 ABC Circuit

5-12. Multiplex

IC4 receives informations such as Audio (L,R), Battery indicator, Iris F, etc and they come out from pin 3 of IC4. Output signal from pin 3 of IC4 is selected by combination of signals of pins 9, 10 and 11. The Output signal is then converted to digital signal by IC7 (a) and supplied to IC1 through pin 19.


Audio(L) IN
IC5(b)
AUDIO L AMP
IC5(d)
+5V(a)
+1.2V REGULATOR
IC5(c)
AUDIO R AMP
Audio(R) IN
IC4
⑬ X0
⑭ X1
Battery Indicator Cont
⑮ X2
Iris F IN
⑫ X3
VR1 AWC/ABC ADJ1
① X4
VR2 AWC/ABC ADJ2
⑤ X5
② X6
④ X7
ABC G
AWC G
⑪ ⑩ ⑨
③
From Pin1 of IC5
IC7(a)
A/D CONVERTER
IC1
⑲ A/D IN
⑮ P72
⑯ P71
⑰ P70

INPUT			CONNECTION
Pin 9	Pin 10	Pin 11	
L	L	L	⑬ — ③
L	L	H	⑭ — ③
L	H	L	⑮ — ③
L	H	H	⑫ — ③
H	L	L	① — ③
H	L	H	⑤ — ③
H	H	L	② — ③
H	H	H	④ — ③

Fig. 5-12 Multiplex Circuit

6. CAMERA ADAPTOR

6-1. RCU Power Control Circuit

This circuit consisting of IC10, IC11, Q18, Q19 and Q20 receives the serial data signal from the RCU, and generates +9V DC when the serial data is being supplied and +9V DC is supplied to all circuits on the main board.

The serial data pulse is supplied to pin 4 of monostable multivibrator IC11, and pin 6 (Q output) becomes high (H) level when the serial data is fed and low (L) level when the serial data is not supplied. This output through inverter Q20 is sent to other circuit as RCU/Camera Selection Signal.

On the other hand, pin 7 of IC11 (Q bar output) turns to low (L) level when the serial data is supplied and it turns Q19 off and +9V DC regulator consisting of IC 10 and Q18 generates regulated +9V DC power using unregulated 12V DC obtained at pin 16 and 18 of CN1 and supplied to the emitter of Q18. The +9V DC is supplied to the serial data control circuit on this board.

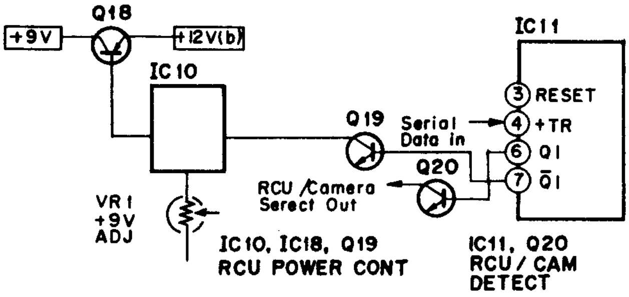
6-2. Serial Data Control Circuit

This circuit receives the control information from the RCU as a serial data (digital signal) and converts it into analog signals and sent them to camera head as control signals.

The serial data from RCU is supplied to comparator IC26(b) through pin 43 of CN1 and the cable loss and noise components are eliminated by IC26(b). The serial data obtained at pin 7 of IC26(b) is then fed to pin 20 of receiver IC25. The serial control pulse (clock pulse) from the RCU is also supplied to pin 21 of receiver IC25 through pin 39 of CN1 and comparator IC26(a) as for the synchronous pulse of serial data communication.

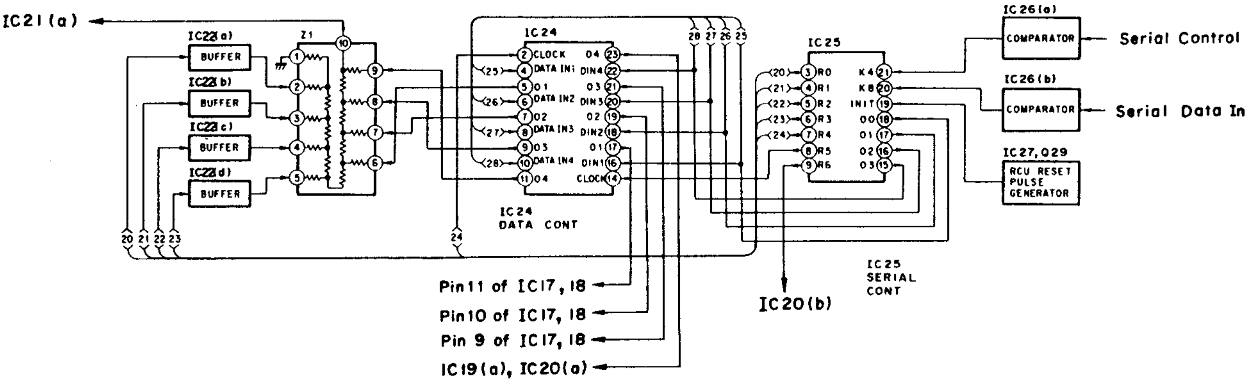
IC27 generates the initial reset pulse for receiver IC25.

IC24 and IC25 decodes the serial data and instructs it at pins 3 through 6 of IC25 via IC22 and pins 5,7,9 and 11 of IC24 as an 8-bit data to be forwarded to a D/A convertor Z1.



Q18
+9V
+12V(b)
IC10
IC11
③ RESET
Q19
Serial Data In
④ +TR
⑥ Q1
Q20
⑦ Q̄1
RCU /Camera Serect Out
VR1 +9V ADJ
IC10, IC18, Q19 RCU POWER CONT
IC11, Q20 RCU / CAM DETECT

Fig. 6-1 RCU Power Control Circuit



IC21 (a)
IC22(a) BUFFER
IC22(b) BUFFER
IC22(c) BUFFER
IC22(d) BUFFER
Z1
IC24
CLOCK
DATA IN1
DATA IN2
DATA IN3
DATA IN4
O1 O2 O3 O4
DIN1 DIN2 DIN3 DIN4
IC24 DATA CONT
IC25
R0 R1 R2 R3 R4 R5 R6
K4 K8 INIT O0 O1 O2 O3
IC26(a) COMPARATOR
Serial Control In
IC26(b) COMPARATOR
Serial Data In
IC27, Q29 RCU RESET PULSE GENERATOR
IC25 SERIAL CONT
IC20(b)
Pin11 of IC17, 18
Pin10 of IC17, 18
Pin 9 of IC17, 18
IC19(a), IC20(a)

Fig. 6-2-1 Serial Data Control Circuit-1

The converted analog signal obtained at pin 10 of D/A convertor Z1 is then supplied to demultiplexer IC17 and IC18 through buffer IC21(a).

The digital control output signals of IC17 and IC18 are fed to camera head through IC13(b), IC15(c), IC16 and Q21 through Q28 and analog control output signals of IC17 and IC18 are supplied to camera head via IC12, IC13(a) and (d), IC14, IC15(b) and IC15(d).

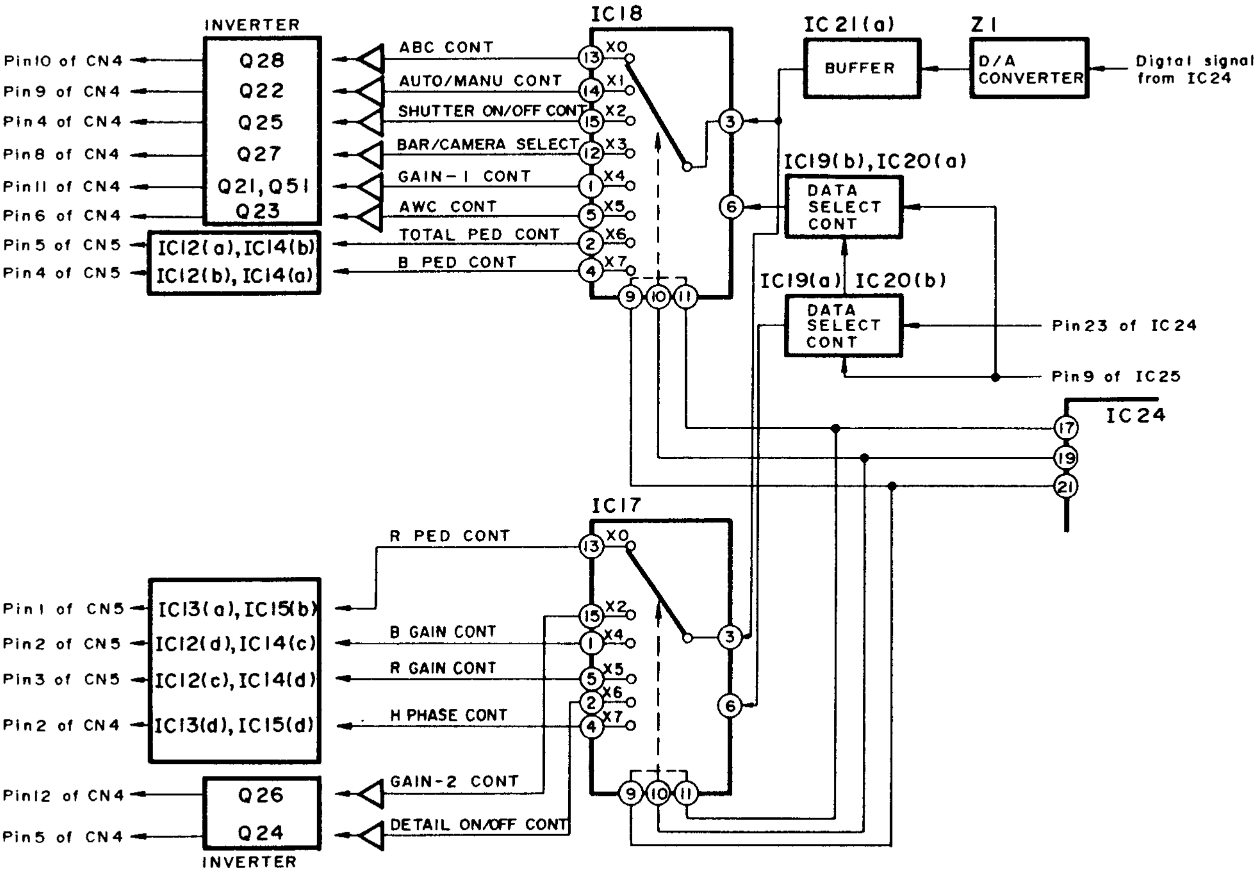

INVERTER
Pin10 of CN4
Pin9 of CN4
Pin4 of CN4
Pin8 of CN4
Pin11 of CN4
Pin6 of CN4
Pin5 of CN5
Pin4 of CN5
Q28
Q22
Q25
Q27
Q21, Q51
Q23
IC12(a), IC14(b)
IC12(b), IC14(a)
ABC CONT
AUTO/MANU CONT
SHUTTER ON/OFF CONT
BAR/CAMERA SELECT
GAIN-1 CONT
AWC CONT
TOTAL PED CONT
B PED CONT
IC18
X0
X1
X2
X3
X4
X5
X6
X7
IC21(a)
BUFFER
Z1
D/A CONVERTER
Digital signal from IC24
IC19(b), IC20(a)
DATA SELECT CONT
IC19(a) IC20(b)
DATA SELECT CONT
Pin23 of IC24
Pin9 of IC25
IC24
IC17
R PED CONT
B GAIN CONT
R GAIN CONT
H PHASE CONT
GAIN-2 CONT
DETAIL ON/OFF CONT
Pin1 of CN5
Pin2 of CN5
Pin3 of CN5
Pin2 of CN4
Pin12 of CN4
Pin5 of CN4
IC13(a), IC15(b)
IC12(d), IC14(c)
IC12(c), IC14(d)
IC13(d), IC15(d)
Q26
Q24
INVERTER

Fig. 6-2-2 Serial Data Control Circuit-2

6-3. Audio Amplifier Circuit

This circuit consisting of IC7,IC8, IC9 and Q14 amplifies the audio signal picked up by the microphone. The amplified audio signal is fed to the VTR for recording and Audio Monitor Jack.

Approximately -70 dB audio signal from microphone is supplied to IC7(a) where the audio signal is amplified 50 dB. As a result, -20 dB audio signal obtained at pin 4 of IC7(a) is supplied to the audio selection analog switch IC8. -60 dB audio signal divided -20 dB audio signal by R65 and R66 is supplied to pin 2 of IC8. The audio level selection signal from SW1 on the Switch board is fed to pin 10 of IC8 via pin 1 of CN1 and the -20 or -60 dB audio signal obtained at pin 15 of IC8 is supplied to the VTR via pin 9 of CN1.

The audio monitor selection signal set by SW2 on the Switch Board is fed to pins 9 & 11 of IC8 to select either INTERNAL or E-E (Playback or Return) audio signal for indicating the audio level on the viewfinder through pin 4 of IC8, IC7(b) and pin 3 of CN6. The selected audio signal obtained at pin 14 of IC8 is sent to the audio monitor jack via pin 7 of CN1, Audio Monitor Level Control VR1 on the Audio Board and the audio amplifier IC9.

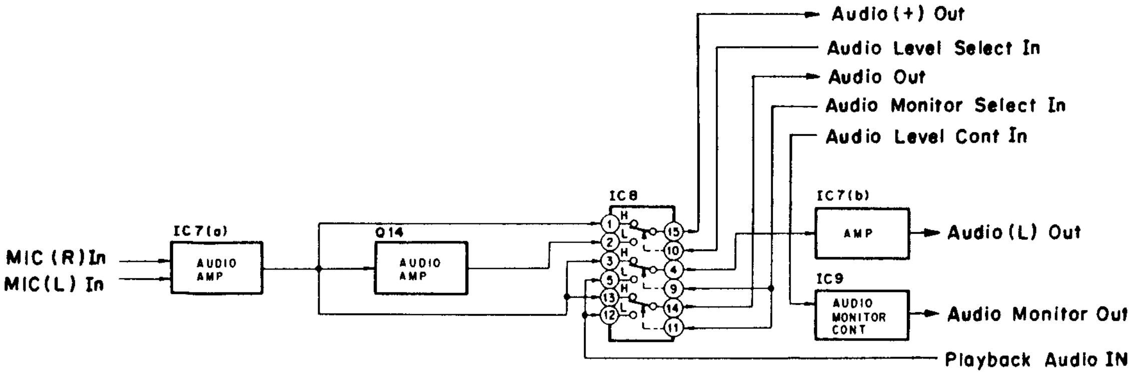


Fig. 6-3 Audio Amplifier Circuit

6-4. VTR Start/Stop Circuit

This circuit receives recording trigger pulse from the lens through Mother board of the camera head and generates the recording start/stop trigger for VTR connected to the camera.

When VTR start/stop button on the lens is pressed, high (H) trigger through pin 1 of CN7 is supplied to Q52 and high (H) trigger is obtained at pin 6 of IC1(a) through Q1.

This trigger a flip-flop consisting of IC1(b) and IC1(c) and the pin 10 of IC10 changes from low (L) level to high (H) level by the first trigger pulse supplied.

The high(H) level is then supplied to Q2 and low(L) level is obtained at collector of Q2. The low (L) level is supplied to base of Q6 and recording trigger (H) level obtained at the collrctor of Q6 is supplied to pin 13 of CN1 for 3/4″ U-vision VTRs and S-VHS VTRs.

Recording trigger (H) level obtained at the collector of Q5 is supplied to pin 15 (VTR START⊕1) of CN1 for 1/2″ VHS VTRs. In the initially turning on the camera power, pin 5 of IC3 becomes low level in oder not to start the recording on the VTR a few seconds period of time.

Recording trigger (L) obtained at the collector of Q4 is supplied to pin 17 (VTR START⊖) for other manufactures VTRs.

The recording trigger pulses obtained at pins 13, 15 and 17 of CN1 is fed to the VTR Compatibility Switch SW4 on the Switch board through pins 2, 3 and 6 of CN7 and pins 4, 5 and 6 of E3 on the Switch board.

This switch selects the required recording trigger pulse according to the VTR connected to the camera.

The VTR Recording or the ON THE AIR talley signal through RCU is selected by the REC/TALLY control circuit consisting of IC2, IC4, IC5(b) IC6(a) Q7 and Q9 so that the recording indicator is on and off by the recording trigger obtained at the collector of Q3 through IC2(c), IC2(b) and Q10 (camera adaptor) /Q17 (viewfinder) in the VTR recoding mode. In this case pin 6 of serial data detector IC11 is low level since no serial data pulse is fed to pin 4 of IC11 and Q20 is turned off to keep the collector of Q20 high level, Q9 turned on and Q7 turned off.

When the RCU is connected to the camera, pin 6 of IC11 becomes high level to turn on Q20 and turn off Q9 and approx.+7V DC obtained at pin 1 of IC6(a) is fed to pins3 and 6 of IC4 and pin 2 of IC5 so that the tally signal from RCU through pin 19 of CN1 is fed to Q10 and Q17 via IC4 and IC2.

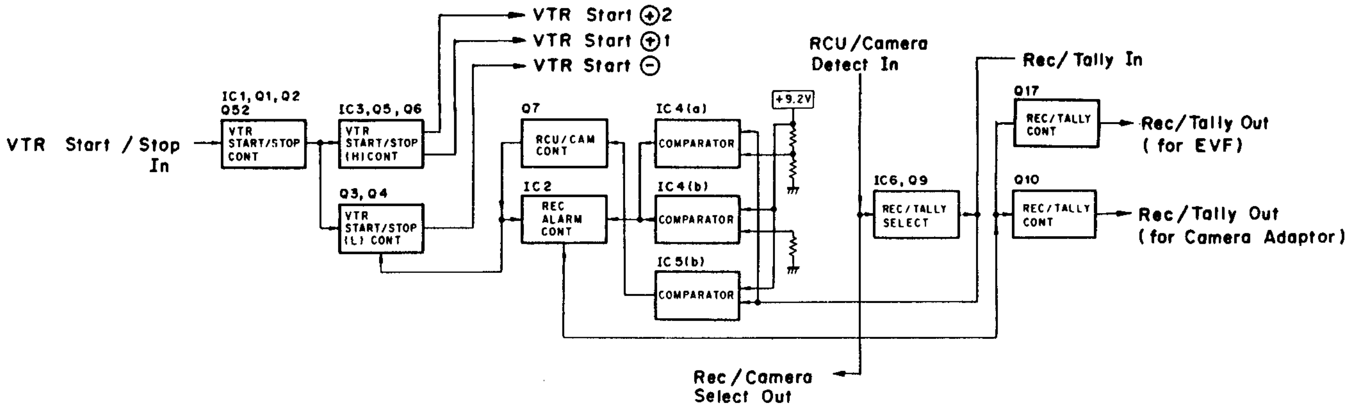

VTR Start ⊕2
VTR Start ⊕1
VTR Start ⊖
RCU/Camera Detect In
Rec/Tally In
VTR Start / Stop In
IC1, Q1, Q2 Q52
VTR START/STOP CONT
IC3, Q5, Q6
VTR START/STOP (H) CONT
Q3, Q4
VTR START/STOP (L) CONT
Q7
RCU/CAM CONT
IC2
REC ALARM CONT
IC4(a)
COMPARATOR
IC4(b)
COMPARATOR
IC5(b)
COMPARATOR
+9.2V
IC6, Q9
REC/TALLY SELECT
Q17
REC/TALLY CONT
Rec/Tally Out (for EVF)
Q10
REC/TALLY CONT
Rec/Tally Out (for Camera Adaptor)
Rec/Camera Select Out

Fig. 6-4 VTR Start / Stop Circuit

6-5. Video/ Auxiliary Selection Circuit

This circuit consisting of IC31, IC33, Q38 through Q40 selects the return video for the viewfinder either playback video or Auxiliary (playback or effect return) video signal.

When the return video control switch on the lens is pressed, low level is fed to pin 9 of IC31 via pin 4 of CN3 and auxiliary video signal fed to pin 53 of CN1 is supplied to Q38 through pins 13, 14, 5 and 4 of IC 31 so that the viewfinder shows auxiliary video signal.

When the return video control switch on the lens is released, high (H) level is sent to pins 9, 10 and 11 of IC31 and composite video signal obtained at the emitter of Q37 is supplied to the VTR via IC31(c), Q40, D4 and pin 51 of CN1.

When the portable S-VHS or VHS VTR is set to playback mode, playback video signal with DC voltage mixed is fed back to pin 51 of CN1. The DC voltage is detected by IC33 and low (L) level obtained at pin 1 of IC33 is fed to pins 10 and 11 of IC31and the playback video signal through Q39, IC 31(b) IC31(a) and Q38 is fed to the viewfinder.

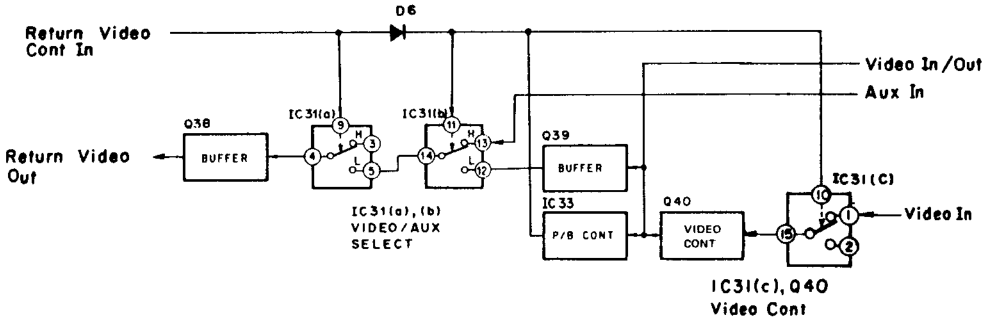

Return Video Cont In
D6
Video In/Out
Aux In
Q38
BUFFER
Return Video Out
IC31(a)
IC31(b)
H
L
IC31(a), (b) VIDEO/AUX SELECT
Q39
BUFFER
IC33
P/B CONT
Q40
VIDEO CONT
IC31(C)
Video In
IC31(c), Q40 Video Cont

Fig. 6-5 Video / Auxiliary Selection Circuit

6. Y/Chroma/Video Output Circuit

This circuit consisting of IC28 through IC30, Q30 through Q37 amplifies the Y (luminance) , Chroma and composite video signal for the 1.0Vp-p/75 ohms load. respectively.

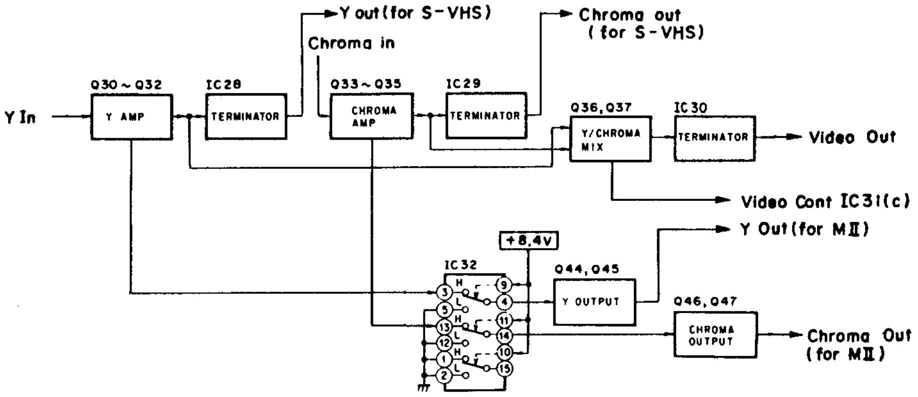

Y out (for S-VHS)
Chroma in
Chroma out (for S-VHS)
Y In
Q30 ~ Q32
Y AMP
IC28
TERMINATOR
Q33 ~ Q35
CHROMA AMP
IC29
TERMINATOR
Q36, Q37
Y/CHROMA MIX
IC30
TERMINATOR
Video Out
Video Cont IC31(c)
+8.4V
Y Out (for MⅡ)
IC32
Q44, Q45
Y OUTPUT
Q46, Q47
CHROMA OUTPUT
Chroma Out (for MⅡ)

Fig. 6-6 Y / Chroma / Video Output Circuit

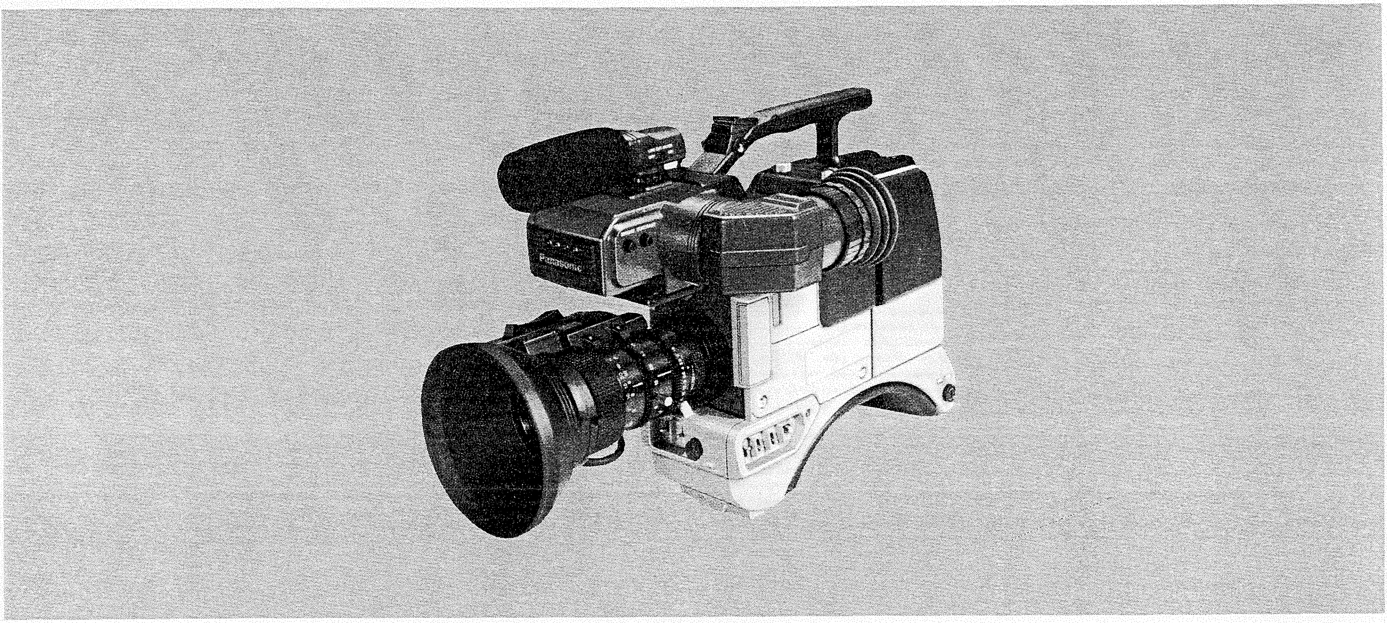
ORDER NO. AVS8904185C8

Service Manual

V10398

PAL Colour Video Camera

WV-F70E Series



Vol. 1

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Vol. 3

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Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 1

Circuit Description

Vol. 1

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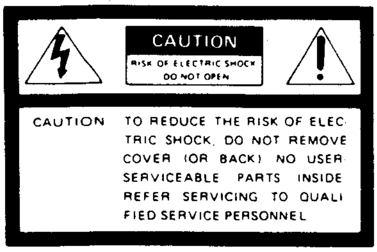
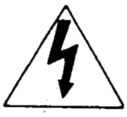
Preliminary



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION TO REDUCE THE RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVER (OR BACK) NO USER SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED SERVICE PERSONNEL



This symbol warns the user that uninsulated voltage within the unit may have suificient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.

This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are indicated by the " ⚠ " mark on the schematic diagram and the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards.
Do not modify the original design without permission of manufacturer.

SPECIFICATIONS

ENG Colour Camera WV-F70E

Pick-up System:		Middle index prism system (F1.4)
Image Sensor:		Two 1/2" interline transfer CCDs Pixels: 681 (Horizontal) X 582 (Vertical)
Scanning Standard:		625 lines, 50 fields, 25 frames
Synchronizing System:		Internal or external (gen-lock), automatically switchable Internal: PAL standard External (gen-lock) Input: PAL composite (VBS) signal or black burst signal
Subcarrier Phase for Gen-lock:		Freely adjustable over 360°
Horizontal Phase for Gen-lock:		Adjustable from −0.1 µsec to +3.5 µsec.
Video Output		Four outputs 1.0 Vp-p PAL composite/75 ohms X 2 (BNC connector) 1.0 Vp-p PAL composite/75 ohms × 1 (32-pin VTR/RCU connector) (PAL composite, Y/C component switchable) PAL: 1.0 Vp-p PAL composite/75 ohms × 1 (32-pin VTR/RCU connector) Y/C: 1.0 Vp-p luminance (Y) composite/75 ohms X 2 (S-Video connector and 32-pin VTR/RCU connector) 0.3 Vp-p burst level chrominance/75 ohms X 2 (S-Video connector and 32-pin VTR/RCU connector) (PAL/(Y/C) switchable)
Auxiliary Input:		1.0 Vp-p composite/75 ohms through 32-pin VTR/RCU connector
Audio Input:		MIC: −70 dBm X 1 (7-pin connector)
Audio Output:		−20 dBm or −60 dBm/unbalanced, switchable (32-pin VTR/RCU connector)
Illumination Required:		2000 lux at F5.0, 3200°K
Minimum Illumination:		30 lux at F1.6 with +18 dB gain, more than 70% output level
Signal-to-noise Ratio:		55 dB (at −6 dB, luminance) without gamma and aperture correction
Horizontal Resolution (at center):		500 lines , Y signal
Registration:		0.05% (entire picture area, excluding lens)
Detail/Aperture:		Horizontal and vertical (2-line type)
White Balance:		Automatic white balance setting (AWC with two memories) and Manual
Black Balance:		Automatic
Encoder:		Y,U,V
Colour Bar:		Built-in EBU colour bar generator
Colour Conversion Filters:		3200°K, 5600°K with 12.5% ND, 5600°K, Close
Maximum Cable Length:		VTR Cable: 30 m (no power supply via cable) 10 m (power supply through cable) 32-pin Studio Cable: Max. 300 m with cable compensator
Switches:	**Camera**	Power, Colour Bar/Camera Selection, High Gain Selection, White Balance Selection, Auto White/Auto Black Set, Level Indicator ON/OFF, VTR Start/Stop, Check, Lens Iris Selection, Detail ON/OFF, Subcarrier Phase Coarse, Recording Time Reset
	Camera Adaptor:	VTR Compatibility, Audio Level Selection, Audio Monitor Selection, VTR Video Output Selection, Power Select, RCU/VTR Signal Selection
	Viewfinder	Peaking ON/OFF, Tally ON/OFF
	Zoom Lens (WV-LZ70/12)	Servo/Manual Zoom Selection, Servo Zoom Control, Iris Control Selection, Auto Iris, Return Video/REC check, Macro, VTR Start/Stop
Controls:	**Camera**	Total Pedestal, Red Gain, Blue Gain, Subcarrier Phase Fine, Horizontal Phase, Lens Iris
	Camera Adaptor	Audio Monitor/Intercom Level
	Viewfinder	Brightness, Contrast

Standard Lens (WV-LZ70/12):	12:1 auto iris servo control zoom lens, 8 – 96 mm with macro mode, F1.6	
Lens Iris:	Automatic or manual	
Lens Mount:	Special screw mount for 1/2″ pickup device	
Lens Filter Size:	62 mm P=0.75	
Viewfinder:	1.5″ (1-3/8″ actual image size) electronic viewfinder with character display and zebra level indicator	
Power Source:	12 V DC, 5 sources as follows: (1) Battery Pack (2) AC Adaptor (3) External DC source through 4-pin DC connector (4) VTR (external AC adaptor) (5) Remote Control Unit through VTR/RCU connector	
Battery Pack Operating Time:	Approximately 1 hour with WV-PS60 Approximately 2 hours with WV-PS33	
Power Consumption:	Camera Head	10.8 watts (12V DC, 0.9A)
	ENG Configuration	13.2 watts (12V DC, 1.1A)
	Studio Configuration	22.8 watts (12V DC, 1.9A)
Ambient Operating Temperature:	−5°C — +45°C	
Ambient Operating Humidity:	30 % — 90 %	
Dimensions:	Camera Head Only (WV-F70E)	119(W) x 211(H) x 155(D) mm
	ENG Configuration (with WV-PS60)	240(W) x 298(H) x 447(D) mm
	Studio Configuration	183(W) × 475(H) × 550(D) mm
Weight:	Camera Head only	1.6 kg (3.5 lbs)
	ENG Configuration	4.8 kg (10.6 lbs)
	Studio Configuration	7.9 kg (17.4 lbs)

Dimensions and weights indicated are approximate.
Specifications are subject to change without notice.

SYSTEM ACCESSORIES

■ COLOUR CAMERA WV-F70HE

• Camera Head	1 set
• Camera Adaptor	1 set
• Shoulder Pad	1 set
• M6 Plug for Intercom	1 pc

■ COLOUR CAMERA WV-F70E

• Camera Head	1 set
• Camera Adaptor	1 set
• 1.5″ Electronic Viewfinder WV-VF38AE	1 set
• 12X Servo Control Zoom Lens WV-LZ70/12E	1 set
• Microphone WV-MC70	1 set
• Shoulder Pad	1 set
• M6 Plug for Intercom	1 pc

■ DOCKABLE KIT WV-DKT70E

- Battery Mount Adaptor
- Camera Handle
- Shoulder Strap WV-QB70

■ MAIN OPTIONAL ACCESSORIES

- 1.5″ Electronic Viewfinder WV-VF38AE
- 5″ Electronic Viewfinder WV-VF65BE
- Remote Control Unit (RCU) WV-RC36
- Stereo Electret Condenser Microphone WV-MC70
- 12X Servo Control Zoom Lens WV-LZ70/12
- Tripod Mounting Adaptor WV-QT70
- 1/2″ Bayonet Mount Adaptor WV-LC70
- Shoulder Strap WV-QB70
- Mic Holder for optional microphone WV-MH70
- Carring Case WV-CC71
- AC Adaptor/Charger WV-PS31
- Battery Pack (1.65 Ah) WV-PS60E
- Battery Pack (3.5 Ah) WV-PS33E
- Battery Charger DE-1232 (for WV-PS60E)
- Battery Charger WV-BC30 (for WV-PS33E)
- Battery Adaptor WV-AD19

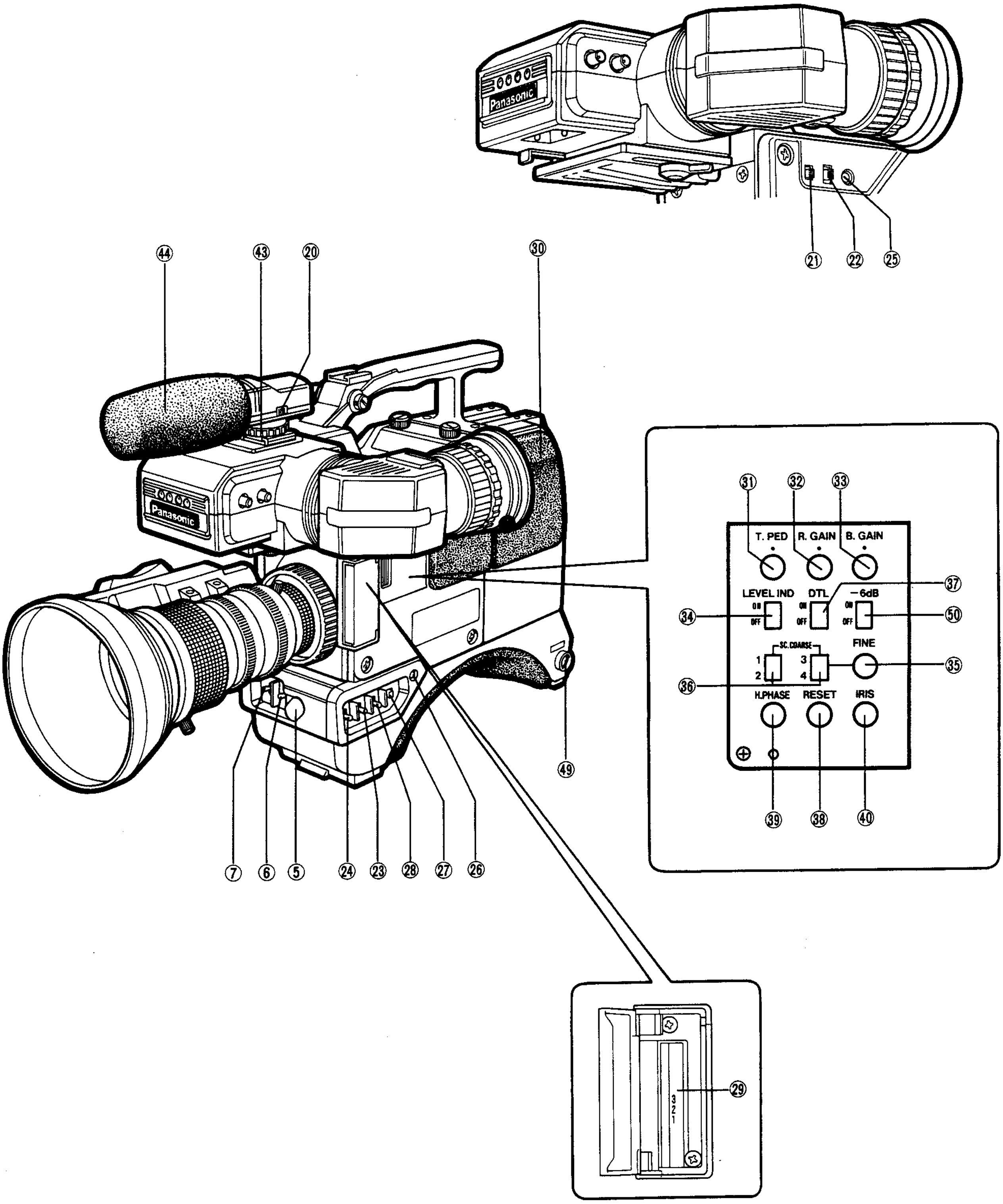
■ OTHER OPTIONAL ACCESSORIES

• VTR Cable:	WV-CA32/10 (32P-10P)	3 m (10 ft)
	WV-CA32A/14 (32P-14P)	3 m (10 ft)
• 10-pin VTR Extension Cable:	10H-30AS	10 m (30 ft)
	10H-50AS	17 m (50 ft)
• 14-pin VTR Extension Cable:	WV-CA14X30	10 m (30 ft)
• Studio Cable:	32A-25	8 m (25 ft)
	32A-50	17 m (50 ft)
	32A-100	30 m (100 ft)

- S-VHS Cable: WV-CA38
- Lens Connector Conversion Cable WV-LC10

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

ENG Colour Camera System, WV-F70E Series



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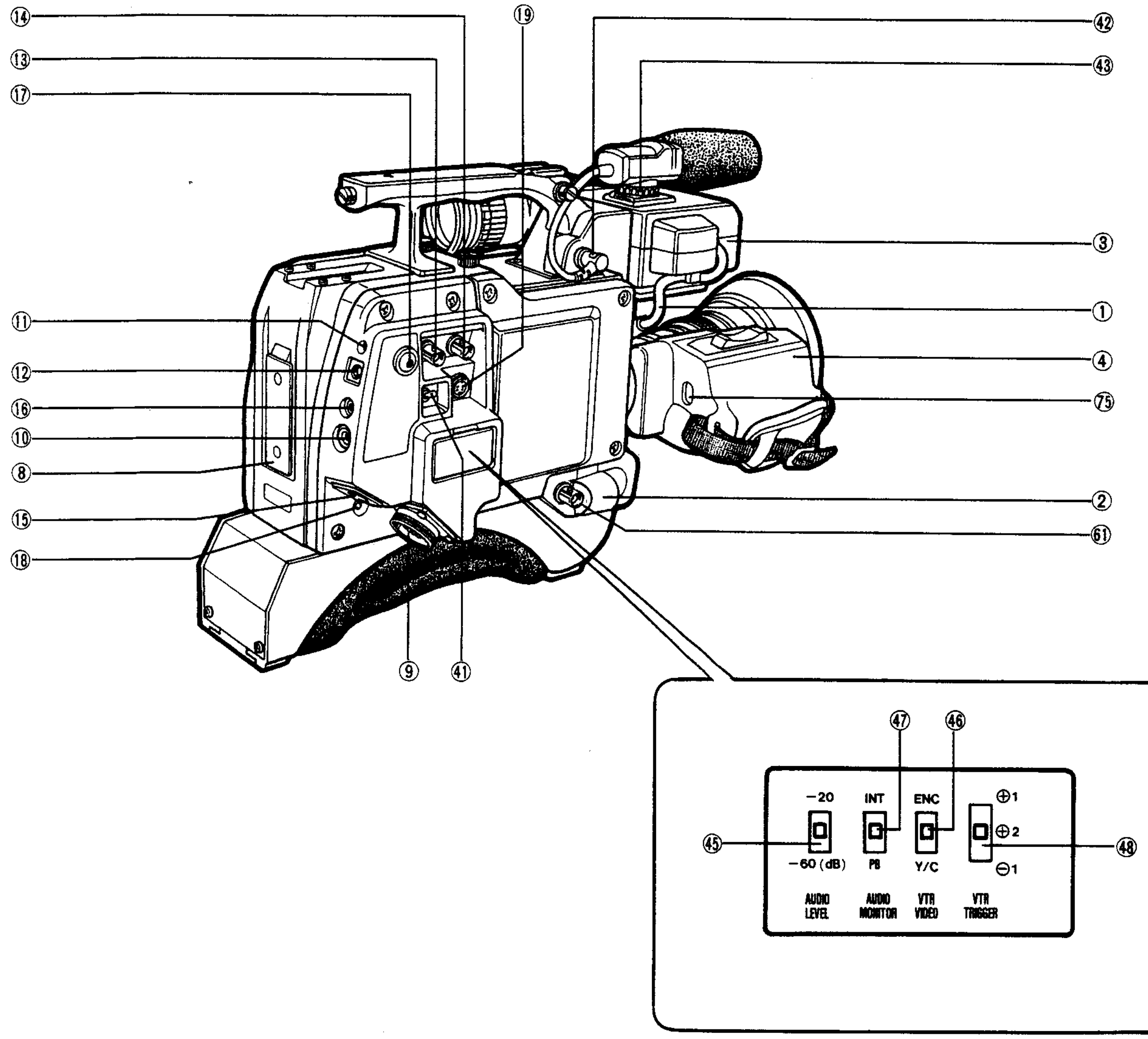


1. **Viewfinder Connector (12-pin) (VIEWFINDER)**
Connect the viewfinder cable from the 1.5" or 5" Electronic Viewfinder to this connector.
Note: When connecting the 5" Electronic Viewfinder WV-VF65B) to this connector, use the Viewfinder Conversion Cable supplied with the WV-VF65B.

2. **Lens Connector (12-pin) (LENS)**
Connect the lens cable to this connector.
Note: If the Auto Iris Servo Control Zoom Lens with an 8-pin connector is to be used, the optional Lens Connector Conversion Cable WV-LC10 is required. This will allow proper matching of the 8-pin connector of the lens with the 12-pin connector of the camera.

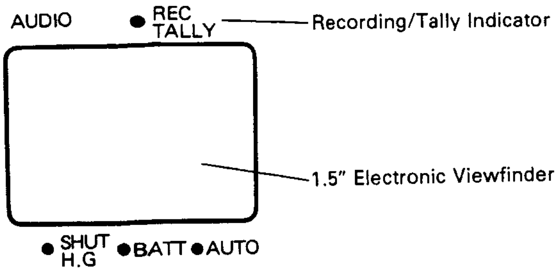
3. **1.5" Electronic Viewfinder**
This small 1.5" (1-3/8" actual image size) monitor shows exactly the image picked up by the lens. The viewfinder can be tilted 90° from horizontal and slid laterally by up to 1-3/4" (45 mm) and 13/16" (20 mm) back and forth.

4. **Auto Iris Servo Control Zoom Lens**
This is a high-quality 8 – 96 mm lens offering automatic as well as manual iris control and servo control zoom. The lens features a special screw mount and F1.6 maximum aperture. Picture size may be magnified by up to 12 times through use of the zoom feature. Simply rotate the macro ring for close-up or wide angle recording. Macro shooting is possible of objects up to 1.4cm (1/2") from the lens surface.

5. VTR Start/Stop Button (VTR) (parallel operation)

This button is used to change the recorder mode from pause (Recording Pause) to recording and functions in the same way as the VTR Start/Stop Button (75) on the lens. Press once to start recording.

While recording, the Recording/Tally indicator in the viewfinder lights and the Tally Light on the viewfinder also lights.



When the button is pressed once more, the recorder is set to the Pause mode (Recording Pause), and the Recording/Tally indicator and Tally Light will go off.

Note: If the attached zoom lens features a lock-release type VTR start/stop button, this VTR Start/Stop button functions only when the corresponding button on the lens is released.

6. Auto White/Auto Black Set Switch (AUTO W/B BAL AWC/HOLD/ABC)

This switch sets the white balance and black balance automatically as follows:

AWC: This position is used for setting the white balance when the White Balance Selection Switch ㉓ is set to the AWC A or AWC B position. White balance adjustment is required when "AWC A NG" or "AWC B NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the viewfinder lights.

Two white balance settings for two light sources, such as indoor and outdoor, can be retained in the memory. In this case both the AWC A and AWC B positions are used.

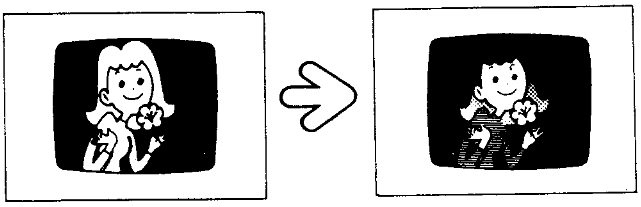
HOLD: In this position, the white and black balances set at the AWC or ABC position can be held fixed if so desired until next setting.

ABC: This position is used for setting the black balance. Black balance adjustment is required when "ABC NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the view finder lights.

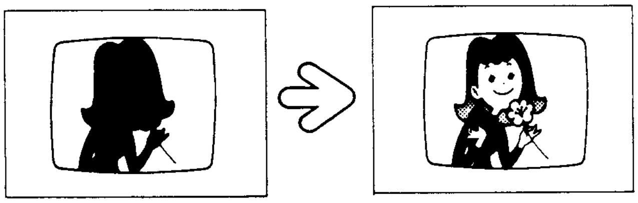
Note: Since the black balance adjustment always is performed automatically first at 0 dB gain and then at +18 dB gain, the picture will flash in the viewfinder while the black balance is being set. This flashing will help informing you of present adjustment.

7. Lens Iris Selection Switch (LENS IRIS 1/2 OPEN, NOR, 1/2 CLOSE)

This switch can be used to set the lens iris opening to compensate for unusual lighting conditions. If the object is brightly lit against a dark background, set this switch to the 1/2 CLOSE position. This will close the lens iris by a 1/2 F-stop.



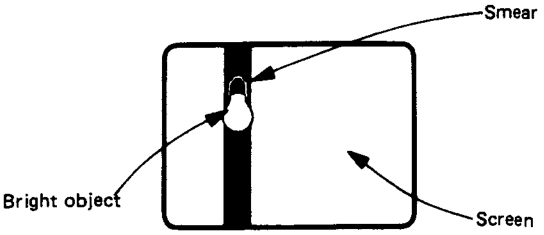
If the object is relatively dark and the background is bright, set the switch to the 1/2 OPEN position. This will open the lens iris by a 1/2 F-stop.



At the normal (NOR) position, the lens is operating with normal lens iris openings.

Note:

1) If this switch is used, be sure to return it to the detent NOR position after use.
2) If the camera is aimed at an extremely bright object, such as the sun or a lamp, vertical bars (i.e. smear) may appear in the picture. This is a peculiar phenomenon of the CCD and is quite normal. Try as much as possible to avoid shooting scenes with extremely blight light, as this could also be harmful to the camera.



3) Set this switch to the NOR position when the camera is used together with the Remote Control Unit (RCU).
4) If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used.

8. Battery Pack Mounting Angle
Mount the Battery Pack WV-PS60/WV-PS33 or the AC Adaptor/Charger WV-PS31 on the camera by sliding it down along this mounting angle.

9. VTR/RCU Connector (32-pin) (VTR/RCU)
When using the camera together with a Panasonic portable colour VTR, the supplied VTR cable should be connected between the camera and VTR. This connector is also used for connection of the 32-pin studio cable from the Remote Control Unit (RCU) for comprehensive system operation. When connecting the 32-pin studio cable to this connector, the camera is automatically set to the RCU operation mode.

1/2" VHS and 3/4" U-vision portable VTR (10-pin)
WV-CA32/10 (32P-10P cable)
1/2" S-VHS and 3/4" U-vision portable VTR (14-pin)
WV-CA32A/14 (32P-14P cable)

10. Intercom Jack (M6) (INTERCOM)
This jack is used for communication between the camera operator and operators of the RCU and Special Effect Generator in the system.

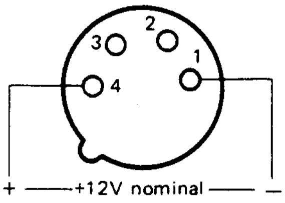
11. Recording/Tally Indicator (red) (REC TALLY)
This indicator lights when the camera is set to the recording mode (through the VTR Start/Stop button), and informs the person concerned of scenes being recorded.
The Tally indicator also lights when the camera is in full system operation together with the Remote Control Unit and Special Effects Generator.
In case a tape is not loaded or the tape end is reached, or if the servo mechanism is working improperly, this indicator will start blinking to warn the operator of such faults.

12. Battery Connector (BATTERY)
Connect the cord from the Battery Pack to this connector.

13. Gen-lock Input Connector (BNC) (GEN-LOCK)
The colour video signal of the camera is automatically synchronized to the gen-lock signal (composite or black burst) which is supplied to this connector. The gen-lock signal is used for system reference, such as when using the Special Effects Generator.
Caution: If the gen-lock signal is jittery (such as when obtained from VTR playback), the camera may not be able to synchronize properly.

14. Video Output Connector (BNC) (VIDEO OUT)
A composite video signal is provided at this connector.

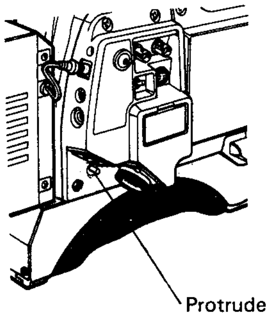
15. External DC Input Connector (XLR, 4-pin) (EXT DC)
This connector accepts the power cable from an external DC source supplying nominal power of 12 V, 1.5 A (a belt type battery or car battery for example). This connector also accepts the power cable from an AC adaptor. For driving the studio configuration, a 12 V DC, 2.5 A power source is required.



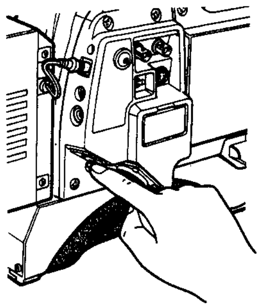
16. Audio Monitor Jack (M3) (AUDIO MONITOR)
When an earphone is connected, the sound picked up through the microphone ㊹ or played back audio on the 1/2"S-VHS or 3/4"U-vision recorder connected to the camera through the 14-pin camera connector can be monitored. Selection of the audio source is enabled by the Audio Monitor Selection switch ㊼ .

17. Audio Monitor/Intercom Level Control (LEVEL)
Use this control to freely adjust the volume level in the earphone connected to the Audio Monitor Jack ⑯ or the headset connected to the Intercom Jack ⑩.

18. Circuit Protector (BREAKER)
When an excessive current flows into the camera by accident or some other reason, the red button of this circuit protector protrudes to cut off the circuit.



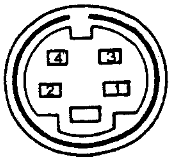
After solving the problem, press the red button again to recover the circuit.



CAUTION:
Refer servicing to qualified service personnel to solve the problem.

19. S-VHS Video Output Connector (S-VIDEO OUT)

The luminance (Y) and chroma (C) signals for S-VHS VTR or monitor are provided at this connector.



S-VIDEO OUT (female)

No.	CONTENTS
1	Y Ground
2	C Ground
3	Y Sigal Output
4	C Signal Output

20. Low Cut Filter Switch (LOW CUT FILTER, ON/OFF)

Normally, set this switch to OFF position. When the noise of strong wind is picked up, set this switch to ON position.

21. Shutter ON/OFF Switch (SHUTTER, ON/OFF)

Fast-moving objects shot as slow shutter speeds, such as is only possible on normal cameras, will appear blurred. This camera, however, features an electronic shutter which can be switched ON and OFF by this switch, and which enables blur-free recording of high-speed action, such as car racing, golf swings, gymnastics, birds in flight, and much more.

OFF: Normal recording with standard shutter speeds.

ON: The electronic shutter mode is engaged for blur-free recording of high-speed action. The electronic shutter speed can be set by the Shutter Speed Selection switch ㉒ .

22. Shutter Speed Selection Switch (1/250, 1/500, 1/1000)

This switch selects the shutter speed of the electronic shutter. The switch can only be operated when the Electronic Shutter ON/OFF switch ㉑ is set to ON.

23. White Balance Selection Switch (WHITE BAL; AWC A/B/MANUAL)

This switch is used to select the white balance mode as follows:

AWC A: The white balance can be set automatically by pressing the Auto White/Auto Black Set Switch ⑥ upwards. The setting is stored in memory A.

AWC B: Similar to AWC A, but the setting is stored in memory B.

MANUAL: Proper white balance is achieved for 3200°K colour temperature with the Filter Wheel ㉙ set to position 1 and setting the Red Gain Control ㉜ and Blue Gain Control ㉝ to their mechanical center position.

Note:

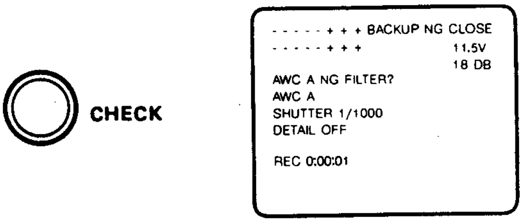
1) Two white balance settings, one each for different lighting conditions such as indoor and outdoor, may be stored in the two memories AWC A and AWC B.
2) This switch should be set to the AWC A or AWC B position when the RCU is used.

24. High Gain Selection Switch (GAIN 0/+9 dB/+18 dB)

Normally set this switch to the 0 dB position. Positions +9 dB and +18dB increase the video output amplitude for low light scenes and are equivalent to opening the lens iris 1.5 or 3 F-stops, respectively.

25. Check Button (CHECK)

The operating conditions of the camera can be displayed on the viewfinder by keeping this button pressed.



26. Power Indicator (POWER)

This indicator lights red when the camera is operating. When the camera is in the standby mode, the indicator lights green.

27. Power Switch (DC POWER; OFF/SAVE/ON)

This switch selects the operating mode of the camera as follows:

OFF: Power to the camera is turned off.

SAVE: The main camera circuit is turned off. The heater of the CRT on viewfinder is on, however. The Power Indicator㉖lights green at this position.

ON: The unit is in the operating condition after necessary adjustments have been made. The Power Indicator lights red.

Note: This switch should be set to the ON position when the camera is used with the Remote Control Unit (RCU).

28. Colour Bar/Camera Selection Switch (BAR/CAMERA)

This switch selects the video output signal as follows:

BAR: An EBU colour bar is provided from the Video Output connector ⑭, (61) and the VTR/RCU connector ⑨.

CAMERA: The actual picture as picked up through the lens is displayed.

Note: This switch is inoperative when the RCU is used.

29. Filter Wheel

To set the filter wheel, flip open the cover.

The filter wheel is a four-position wheel which controls two built-in colour temperature conversion filters and one ND filter.

(1) 3200°K — indoor light (tungsten, halogen, quartz lamps)

(2) 5600°K +12.5% ND — daylight (sunny)

(3) 5600°K — daylight (cloudy/rainy)

(4) Closed

Select the position according to the light source. The position of the filter wheel is displayed in the viewfinder when the CHECK button ㉕ is pressed.

30. Camera Adaptor

The camera adaptor is pre-installed on the camera at the factory. The adaptor is required for ENG, EFP and studio applications. It should be removed if the camera is to be used with S-VHS dockable VTRs.

31. Total Pedestal Level Control (T.PED)

This control can adjust the pedestal level of the video signal (luminance) for matching the pedestal level of more than two cameras in the system. Use a waveform monitor or oscilloscope for precise adjustment.

32. Red Gain Control (R.GAIN)

This control only works when the White Balance Selection switch ㉓ is set to the MANUAL position. The control is used to match the red gain with the colour signals of other cameras in the system. The red gain should be set to its mechanical center position for proper white balance for 3200°K colour temperature with the Filter wheel ㉙ set to position 1.

33. Blue Gain Control (B.GAIN)

This control only works when the White Balance Selection switch ㉓ is set to the MANUAL position. The control is used to match the blue gain with the colour signals of other cameras in a system. The blue gain should be set to its mechanical center position for proper white balance for 3200°K colour temperature with the Filter wheel ㉙ set to position 1.

Note: The Red and Blue Gain controls ㉜ and ㉝ cannot be operated when the White Balance Selection switch ㉓ is set to AWC A or AWC B.

34. Level Indicator ON/OFF Switch (LEVEL IND ON/OFF)

When this switch is set to ON, picture images exceeding the specified level (0.7 Vp-p) will produce a zebra pattern in the viewfinder.

If the background is bright and the object appears too dark in the automatic iris control mode, the lens iris should be adjusted manually until the zebra pattern barely appears. If the zebra pattern is visible, overexposure of the background will take place.

When in the automatic iris control mode, set this switch to OFF.

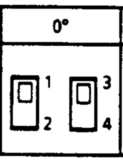
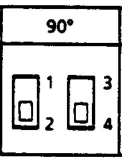
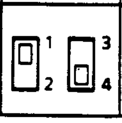
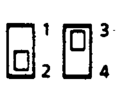
35. Subcarrier Phase Fine Control (SC PHASE)

This control allows fine adjustment of the subcarrier phase set by the Subcarrier Phase Coarse Switches ㊱. The control allows continuous control of up to +90° subcarrier phase to match the phase of the subcarrier signal obtained at the Gen-Lock Input connector ⑬.

This control should be adjusted together with the Subcarrier Phase Coarse switches ㊱ when the camera is used in a system configuration including the Special Effects Generator.

36. Subcarrier Phase Coarse Switches (SC PHASE COARSE)

The subcarrier phase of the camera signal can be adjusted from 0° to 360° in 90° steps with these switches, as shown below, for matching the phase of the subcarrier signal at the Gen-Lock Input connector ⑬. These switches should be set when the camera is used in a system configuration with the Special Effects Generator.

Subcarrier Phase	0°	90°	180°	270°
Position of Switches				

37. Detail ON/OFF Switch (DTL ON/OFF)

The detail/aperture enhancement can be switched by this switch while observing the sharpness of the picture.

38. Recording Time Reset Button (REC TIME)

The accumulated recording time is displayed in the viewfinder under REC TIME while the CHECK button ㉕ is pressed. The time can be reset to "0:00:00" by pressing this button. Thus, total recording time can easily be checked by pressing this button at the outset of a new recording.

Note: For studio application, the time the Tally light lights is accumulated in the viewfinder REC TIME display.

39. Horizontal Phase Control (H.PHASE)

The horizontal phase of the camera signal can be adjusted to match the horizontal phase of the signal at the Gen-Lock Input connector ⑬.

This control should be adjusted when the camera is used in a system configuration with the Special Effects Generator.

40. Lens Iris Control (IRIS)

The auto iris level of the lens which requires DC control signal for auto iris control can be adjusted by this control. When the lens which requires a video signal for auto iris control such as WV-LZ70/12 is used, this control will have no effect and please use the lens iris control on the lens.

Note: If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used. In this case the lens iris control will have no effect. If such adjustment should be necessary, please use the lens iris control on the lens.

41. Power Selection Switch
(POWER SELECT BATT/EXT DC-VTR/RCU)

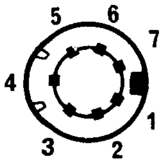
Using this switch, the desired power source connected to the camera may be freely selected.

BATT/EXT DC: This position is used for power supply from the battery pack, an external DC source or through an AC adaptor.

VTR/RCU: This position is used when power is to be supplied through the 32-pin connector from the VTR or the Remote Control Unit (RCU).

42. Microphone Connector (7-pin)
(MICROPHONE)

Connect the cord from the optional microphone WV-MC70 to this connector.



1 : Ground
2 : N/C
3 : Right out
4 : N/C
5 : Left out
6 : N/C
7 : +B in

43. Microphone Holding Ring

To secure the microphone, turn this ring clockwise.

44. Microphone

This is an unidirectional stereo electret condenser microphone. The output level of the microphone is approximately −70 dB.

45. Audio Level Selection Switch
(AUDIO LEVEL −20/−60 dB)

Two audio output levels to the VTR can be selected: −20 dB or −60 dB. The camera has been preset to −20 dB at the factory.

46. VTR Video Output Selection Switch
(VTR VIDEO ENC-Y/C)

This switch selects the video output signal obtained at the VTR/RCU connector ⑨.

ENC: A composite video signal is supplied for 1/2" VHS and 3/4" U-vision portable VTRs.

Y/C: A component signal (luminance (Y) and chrominance (C) signals) are supplied for S-VHS VTRs.

Note:

1) If this switch is set to the Y/C position, when a recorder other than an S-VHS recorder is used, colour recording cannot be made.
2) The camera has been preset to the ENC position at the factory.

47. Audio Monitor Selection Switch (INT/PB)

This switch selects the audio signal from the Audio Monitor jack ⑯ to be monitored.

INT: The sound picked up by the microphone can be monitored.

PB: The played back audio portion from the 1/2" S-VHS or 3/4" U-vision recorder, obtained through the 68-pin connector or the 14-pin camera connector, can be monitored.

Note: The camera has been preset to the INT position at the factory.

48. VTR Compatibility Switch (⊕1/⊕2/⊖1)

Set this switch according to the VTR which is connected to the camera.

⊕1: For 1/2" VHS VTRs.

⊕2: For 3/4" U-vision VTRs, connected to the camera using a 14-pin connector and S-VHS VTRs.

⊖1: If a VTR of other manufacture is used, and if this VTR pauses when the tape should be running and vice versa, this switch should be set to this position.

Note:

1) The switch has been preset to the ⊕1 position at the factory.
2) Some VTRs may not operate properly when connected to this camera, even though the setting of this switch is changed. Please consult your dealer for further information.

49. Fuse

A 5A 250V fuse is installed in the fuse holder. For continued protection of the equipment, do not install a fuse of a higher current rating.

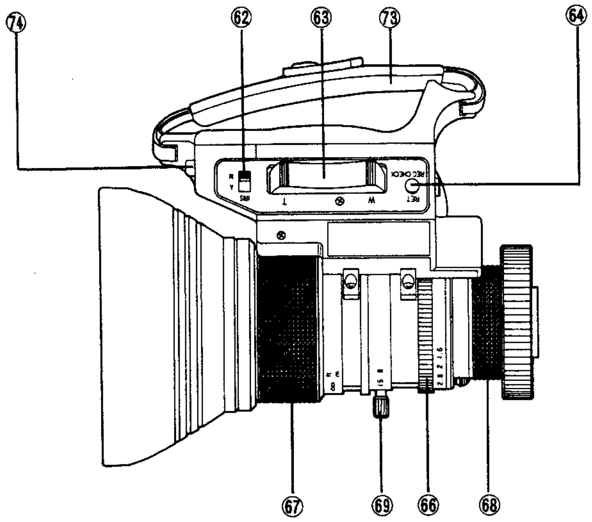
50. −6 dB ON/OFF Switch

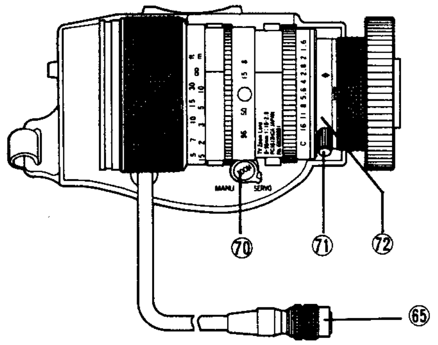
Normally set this switch to OFF position. In combination with the High Gain Selection Switch ㉔, the overall gain of the camera can be set to −6 dB, 0 dB, +3 dB, +9 dB, +12 dB or +18 dB. Refer to page 52 for setting and character display on viewfinder.

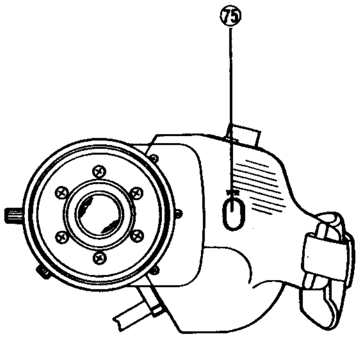
61. Monitor Output Connector (BNC) (MONITOR OUT)

A composite video signal for monitoring is provided at this connector.

12X Servo Control Zoom Lens WV-LZ70/12







62. Iris Control Selection Switch (A/M)

This switch selects the operational condition of the lens iris.

A (Auto): The lens iris is automatically controlled. When the camera is used in studio applications together with the Remote Control Unit (RCU), the switch should be set to M (Manual) position. In this case, the lens iris can not be remotely controlled from the RCU.

M (Manual): The lens iris can be manually controlled by rotating the Iris ring (66).

63. Servo Zoom Control (Wide/Tele)

The zoom function of this high quality 12:1 zoom lens can be controlled by pressing this control. Zooming to tele as well as wide angle is possible. Furthermore, the zooming speed can be controlled by changing the pressure applied on this control.

64. Return Video/Recording Check Button (RET/REC CHECK)

When an auxiliary signal such as a lineview signal from a Special Effects Generator is supplied to the auxiliary connector of the Remote Control Unit (RCU) while the camera is set up for system operation, the signal can be previewed on the electronic viewfinder as long as this button is kept pressed.

When the 3/4" U-vision portable recorder, connected through the 14-pin camera input connector, or an S-VHS VTR recorder is set to the playback mode, the played back picture can be viewed as long as this button is kept pressed.

65. Lens Cable with 12-pin Connector

This cable supplies power to the servo control zoom motor and the automatic iris control device.

The cable should be connected to the Lens Connector ② on the camera.

66. Iris Ring

When the Iris Control Selection switch (62) is set to the M (manual) position, the lens iris can be manually adjusted by rotating this ring.

67. Focus Ring

Rotating this ring will change the lens focus.
By observing the picture in the viewfinder, correct focus can easily be set.

68. Macro Ring

For close-up shooting, rotate this ring to the macro area. After setting the Servo/Manual Zoom Selection switch (70) to the MANU (manual) position, close-up shooting up to approximately 14 mm (1/2") from the lens surface is possible by rotating the Macro Ring/Lever.

69. Zoom Ring/Lever

By setting the Servo/Manual Zoom Selection switch (70) to the MANU (manual) position, zooming can be manually performed through use of this ring/lever. 12 times magnification is possible from wide angle to telephoto. When the Servo/Manual Zoom Selection switch (70) is set to the SERVO position, zooming is performed with the Servo Zoom control (63).

70. Servo/Manual Zoom Selection Switch (SERVO/MANU)

This switch is used to select between zooming by servo control and manually.

SERVO: Zoom operation is performed by pressing either side of the Servo Zoom control (63).

MANU: Zoom operation is performed manually by rotating the Zoom Ring/Lever(69).

71. Flange-back Lock Knob

The Flange-back Adjustment Ring (72) can be locked by turning this knob.

72. Flange-back Adjustment Ring

The flange-back of the lens can be adjusted by rotating this ring. The Flange-back Lock knob (71) should be released prior to adjustment.

73. Hand Strap

The hand strap helps the camera operator in getting a firm grip on the camera. The hand strap length can be freely adjusted.

74. Auto Iris Fine Control (FINE, L/H)

The auto iris level can be adjusted by this control. Normally, set this control to the center (detent) position. When the lens iris should be slightly opened, turn this control to the H (High) direction and slightly closed, turn this to the L (Low) direction.

75. VTR Start/Stop Button (VTR)

This switch is used to start and pause the connected recorder. The function of the button is identical to the VTR Start/Stop Button ⑤ on the camera.
After having set the recorder to the recording standby mode, press this button to start and pause recording. While recording is in progress, the Recording/Tally indicator in the viewfinder and the Tally light (51) on front of the viewfinder lights.

Note: If a zoom lens with an 8-pin connector is used, the lens connector conversion cable WV-LC10 must also be used. In this case, if recording is started by pressing the VTR Start/Stop button on the lens, the recording cannot be paused by pressing the VTR Start/Stop button ⑤ in the camera. To pause recording, the VTR Start/Stop button on the lens must be pressed again.

1. Outline

Incoming light which contains luminance (Y) and chrominance (C) enters a prism through a zoom lens and separated into the Y and C signal component respectively. The separated Y and C signal component go to the respective frame interline transfer (FIT) CCD image sensor and converted into the modulated signal whose peak-to-peak level corresponds to the incoming light intensity. The CCD drive pulse generator generates a horizontal (H) and a vertical (V) transfer pulse which are synchronized with the horizontal and vertical drive (HD & VD) pulses and sends them to the CCD image sensors for driving the sensors. The modulated signals from the CCD image sensors are then sent to the preamplifier circuit. In the preamplifier circuit, these signals are detected by the correlative double-sampling and the video signals are obtained.

The R, G and B signal thus made are respectively fed to the signal processing circuit where their gain is controlled by setting the High Gain Selection Switch. In the signal processing circuit, the black level of these signals between the 0dB and +18dB position of the High Gain Selection Switch are automatically aligned and the gain of the R and B signals are automatically adjusted to match them with that of G signal for the white balance setting by the DC voltages supplied from the Power/Auto board. The black level variation of R, G and B signals due to the lens flare is also compensated in this circuit.

The R, G and B signals are then fed to the pedestal control circuit inside IC, where the black level of the R and B signals are automatically adjusted to align them with that of G signal for the black balance setting by the DC voltages supplied from the Power/Auto board.

The R, G and B signals whose pedestal levels are set are applied to the gamma correction circuit in IC to correct the non-linear photoelectric conversion characteristic of cathode ray tube and to produce a linear picture of high fidelity. The signals from the gamma correction circuits are non-additively mixed each other and the highest signal is detected. The highest signal is supplied to the lens iris control circuit and used to control the lens iris corresponding to the incoming light intensity.

The Y signal from the Preamp/Drive board is supplied to the detail generator circuit and mixed with 1H detail signal to enhance the horizontal and vertical sharpness.

The R, G and B signals are then supplied to the camera/bar select circuit in the Sync/Encoder board. The R, G and B bar signals are also sent to the select circuit from the color bar generator circuit. These signals are selected by setting the Color Bar/Camera Selection Switch and sent to the V, U and luminance (Y) matrix circuit respectively. The V and U signal are fed to the chroma processing circuit where these signals modulate the subcarrier (SC) signal from the sync pulse generator IC and the chrominance signal is made. The chrominance signal is sent to the video output circuit where it is mixed with the Y signal to make a video signal. The video signal is sent to other system products through the video output connector or the camera adaptor. The Y signal (component output) are fed to the MII format VTR for recording. The Y signal is also fed through the viewfinder signal processing circuit to the viewfinder together with the character signal and the zebra pattern signal.

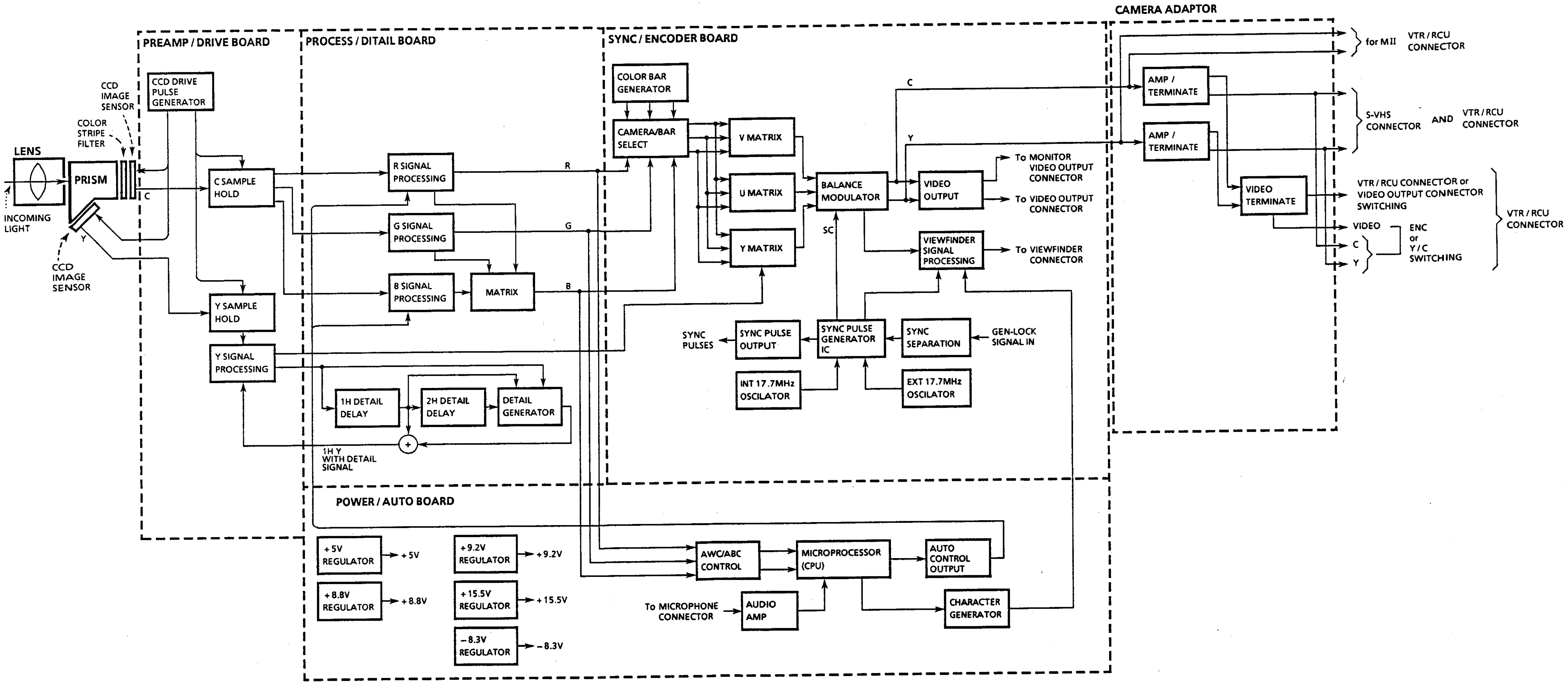
The 17MHz frequency oscillated in the internal 17MHz oscillator in the Sync/Encoder board is fed to the sync generator. The subcarrier signal and the pulses necessary for making a video signal are sent to other circuit through the pulse generator circuit. The sync separation circuit receives the black burst signal or composite video signal supplied to the gen-lock input connector. In the gen-lock circuit, the subcarrier (SC) signal and the horizontal drive (HD) pulse generated in the sync generator circuit are compared in phased with those separated from the gen-lock signal and the error in comparison controls the 17MHz voltage controlled oscillator. The 17MHz signal is fed to the sync generator circuit to generate the subcarrier signal and the horizontal drive pulse. As a result, the phase lock loop (PLL) is formed and the sync generator circuit generates the subcarrier signal and pulses which are synchronized with the gen-lock signal.

The R, G and B signals are sent to the auto-white control circuit and the auto-black control circuit. In the auto-white control circuit, the R and B signal levels are compared with the reference G signal and the error level in comparison is sent to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B signal processing circuits to control the gain of the R and B signal and to match them with the G signal level. In this way, the R, G and B signal levels become same and the white balance is automatically set.

Similarly, the dark level of the R and B signals are compared with that of G signal in the auto-black control circuit and the resultant in comparison is fed to the microprocessor. The microprocessor sends the DC voltages via the auto control output circuit to the R and B pedestal control circuit in order to control the black level of the R and B signal and to match them with that of G signal automatically. During the black balance setting, the black level of the R, G and B signals at the +18dB position of the High Gain Selection Switch are respectively compared with those at the 0dB position using the auto-black balance setting circuitry. The output in comparison is fed to the microprocessor and the microprocessor supplies the DC voltage through the auto control output circuit to the R, G and B signal processing circuit in the ProcessDetail board to control the black levels in the +18dB position for matching with those in the 0dB position automatically.

When the automatic white or black balance setting fails, the microprocessor sends the signal to the character generator to generate the warning character. The warning character is displayed in the viewfinder through the viewfinder signal processing circuit in the Sync/Encoder board.

The power circuit generates from +12V DC the DC voltages used in the camera and sends them to other boards.


CAMERA ADAPTOR
PREAMP / DRIVE BOARD
PROCESS / DITAIL BOARD
SYNC / ENCODER BOARD
CCD IMAGE SENSOR
CCD DRIVE PULSE GENERATOR
COLOR STRIPE FILTER
LENS
PRISM
C
Y
INCOMING LIGHT
CCD IMAGE SENSOR
C SAMPLE HOLD
Y SAMPLE HOLD
Y SIGNAL PROCESSING
R SIGNAL PROCESSING
G SIGNAL PROCESSING
B SIGNAL PROCESSING
MATRIX
R
G
B
1H DETAIL DELAY
2H DETAIL DELAY
DETAIL GENERATOR
+
1H Y WITH DETAIL SIGNAL
COLOR BAR GENERATOR
CAMERA/BAR SELECT
V MATRIX
U MATRIX
Y MATRIX
BALANCE MODULATOR
SC
C
Y
VIDEO OUTPUT
To MONITOR VIDEO OUTPUT CONNECTOR
To VIDEO OUTPUT CONNECTOR
VIEWFINDER SIGNAL PROCESSING
To VIEWFINDER CONNECTOR
SYNC PULSES
SYNC PULSE OUTPUT
SYNC PULSE GENERATOR IC
SYNC SEPARATION
GEN-LOCK SIGNAL IN
INT 17.7MHz OSCILATOR
EXT 17.7MHz OSCILATOR
AMP / TERMINATE
AMP / TERMINATE
VIDEO TERMINATE
for MII
VTR / RCU CONNECTOR
S-VHS CONNECTOR
AND
VTR / RCU CONNECTOR
VTR / RCU CONNECTOR or VIDEO OUTPUT CONNECTOR SWITCHING
VIDEO
C
Y
ENC or Y/C SWITCHING
VTR / RCU CONNECTOR
POWER / AUTO BOARD
+5V REGULATOR
+5V
+8.8V REGULATOR
+8.8V
+9.2V REGULATOR
+9.2V
+15.5V REGULATOR
+15.5V
−8.3V REGULATOR
−8.3V
AWC/ABC CONTROL
MICROPROCESSOR (CPU)
AUTO CONTROL OUTPUT
To MICROPHONE CONNECTOR
AUDIO AMP
CHARACTER GENERATOR

Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 2

Adjustment Procedures

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Adjustment Procedure

1. TEST EQUIPMENT REQUIRED

Following equipments are required for adjustment of WV-F70.

- Test signal generator (Black burst) or special effects generator (Black burst output)
- Waveform monitor
- Vectorscope
- Oscilloscope (Dual trace, More than 100MHz bandwidth, Delayed sweep)
- Digital voltmeter
- Frequency counter (More than 50MHz measurable frequency range)
- Monochrome underscanned video monitor (more than 800 lines resolution)
- Color video monitor
- Logarithmic gray scale chart (YWV2310RB99)
- Color chart (YWV2100RB98)
- In-mega cycle chart (YFINMEGA-K)
- Registration/White set chart (YFV8RA0011A3)
- AC adaptor (WV-PS31) or DC power supply (DC 12V, 3A or more)
- Lighting (300 footcandles (3000 lux), 3200°K)
- Lux meter
- Tripod
- Tripod mounting adaptor (WV-QT70)
- 12X power zoom lens (WV-LZ70/12)
- Camera adaptor
- Extension board (YWVOEA0071AN)
- Extension cables (YWVOEA0070AN)

2. DISASSEMBLING PROCEDURE FOR ADJUSTMENT

2-1 Camera

2-1-1 Side Cover

- Loosen four screws which hold the side cover and remove the side cover.

(A) For left side cover (viewed from the front)

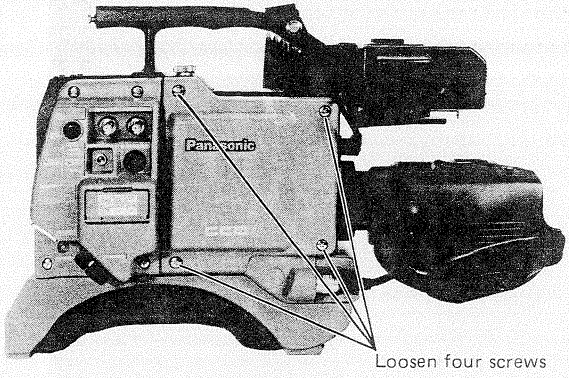


Fig. 2-1-1

(B) For right side cover (viewed from the front)

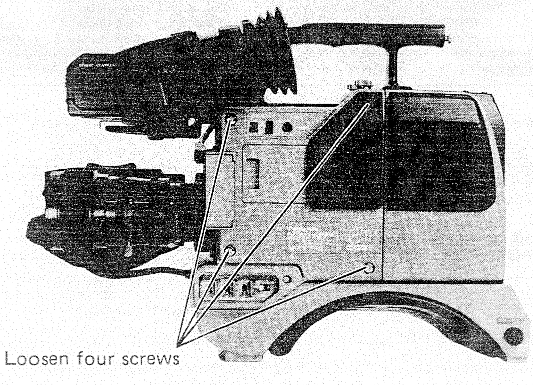


Fig. 2-1-2

2-1-2 Preamp/Drive Board

- Loosen four screws holding the left side cover and remove the left side cover as shown in Fig.2-1-1.
- Disconnect flexible cables connecting to CN2 and CN4 on the Preamp/Drive board by pulling the latch forward. (Fig.2-1-3)
- Remove felight beads from shield case on the Preamp/Drive board and disconnect CN6 on the Preamp/Drive board. (Fig.2-1-3)

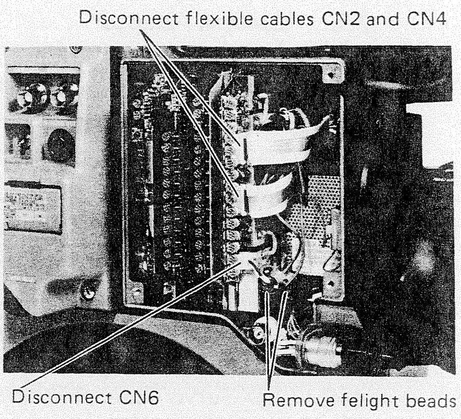


Fig. 2-1-3

- Remove the Preamp/Drive board from Mother board by pulling it forward. (Fig.2-1-4)

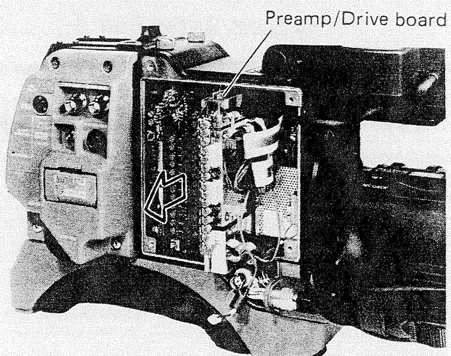


Fig. 2-1-4

- Remove two felight beads from the shield case on the Preamp/Drive board and disconnect CN3, CN5 and CN7 on the Preamp/Drive board. (Fig.2-1-5)

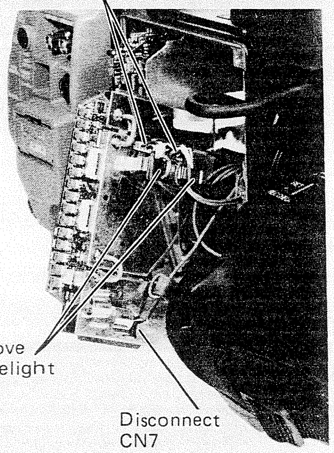

Disconnect CN3 and CN5
Remove two felight beads
Disconnect CN7

Fig. 2-1-5

2-2 Camera Adapter

- Loosen two screws and remove two screws holding the hand grip (M91) and remove the hand grip. (Fig.2-2-1)

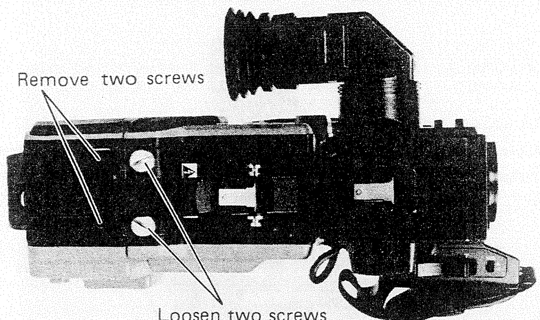

Remove two screws
Loosen two screws

Fig. 2-2-1

- While pushing release button remove the camera adaptor by pulling it backward. (Fig.2-2-2)

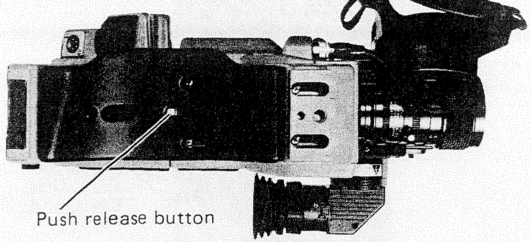

Push release button

Fig. 2-2-2

- Remove three screws holding the rear cover (M62) and four screws holding the operation cover. (Fig.2-2-3)

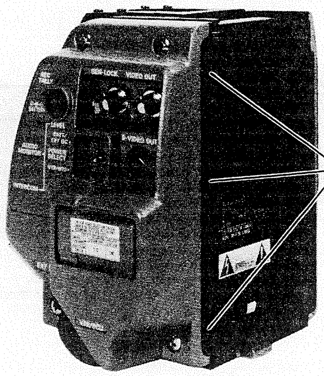

Remove three screws

Fig. 2-2-3

- Pull the operation cover with the Main board backward. (Fig.2-2-4)

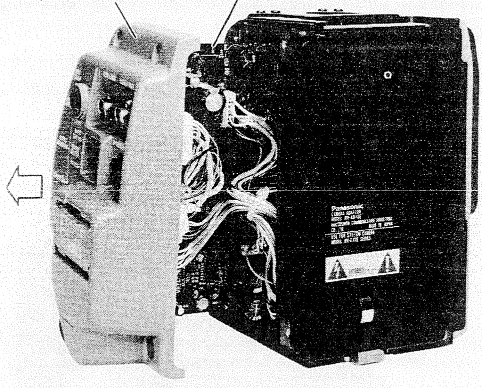

Operation cover
Main board

Fig. 2-2-4

2-3 12X Servo Control Zoom Lens WV-LZ70/12

- Disconnect the lens cable to the 12-pin lens connector on the camera.
- Turn the lens holding ring counter-clockwise and remove the lens.

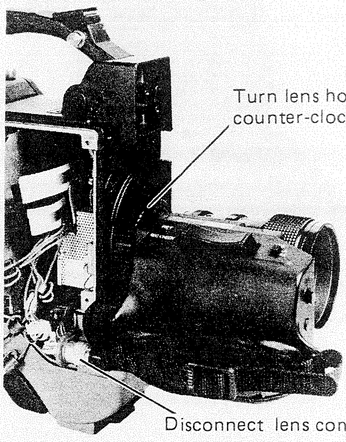

Turn lens holding ring counter-clockwise
Disconnect lens connector

Fig. 2-3-1

- Remove ten screws holding main cover and remove main cover.

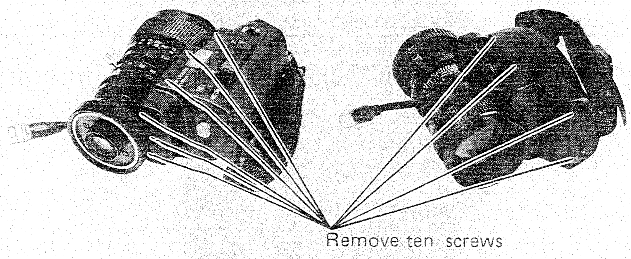

Remove ten screws

Fig. 2-3-2

3. Prism and CCD Assembly Replacement

- Remove the Preamp/Drive board while referring to 2-1-2 Preamp/Drive board.
- Remove the viewfinder from the camera by releasing the locks. (Fig.3-1)

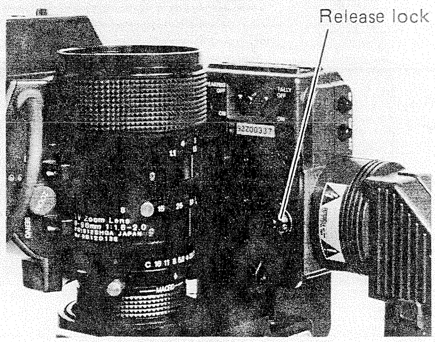

Release lock

Fig. 3-1

- Remove three screws holding the EVF mounting angle and remove the EVF mounting angle. (Fig.3-2)

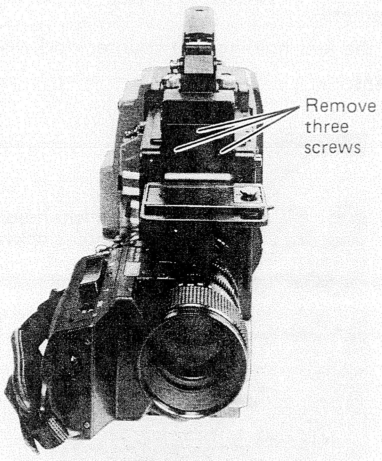

Remove
three
screws

Fig. 3-2

- Remove four screws holding the bottom cover (M105) and remove the bottom cover. (Fig.3-3)

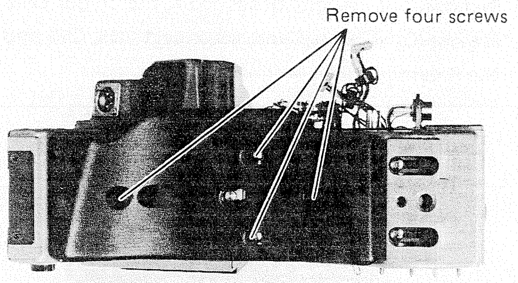
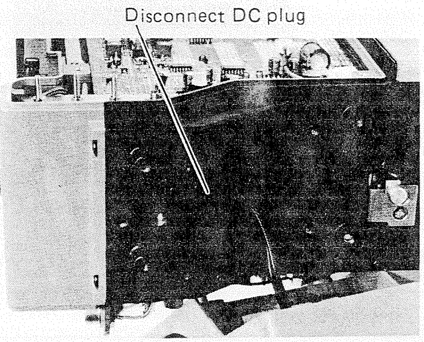

Remove four screws

Fig. 3-3

- Disconnect DC plug from the camera by pulling it forward. (Fig.3-4)


Disconnect DC plug

- Remove four screws holding the front cover (M1) and remove the front cover. (Fig.3-5)

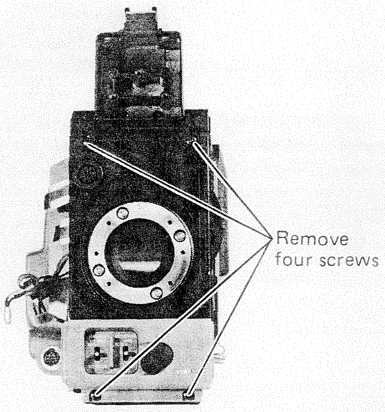

Remove
four screws

Fig. 3-5

- Disconnect CN6, CN7, CN10 and CN11 on the Mother board. (Fig.3-6)

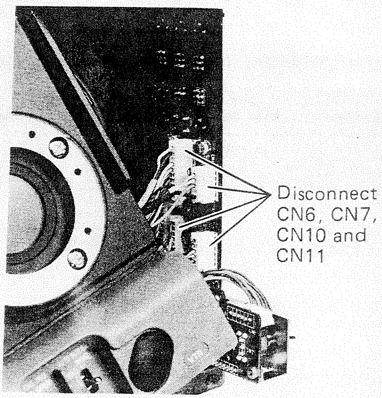

Disconnect
CN6, CN7,
CN10 and
CN11

Fig. 3-6

- Remove two screws holding the shield plate (M10) and remove the shield plate. (Fig.3-7)

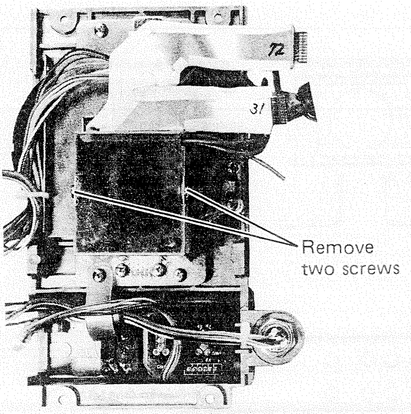

72
31
Remove
two screws

Fig. 3-7

- Remove three screws holding the shield case (M7) and remove the shield case. (Fig.3-8)

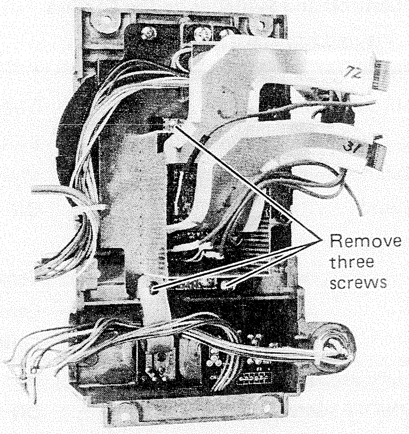

72
31
Remove
three
screws

Fig. 3-8

- Remove two screws holding the Prism and CCD assembly (M6) and remove the Prism and CCD assembly. (Fig.3-9)

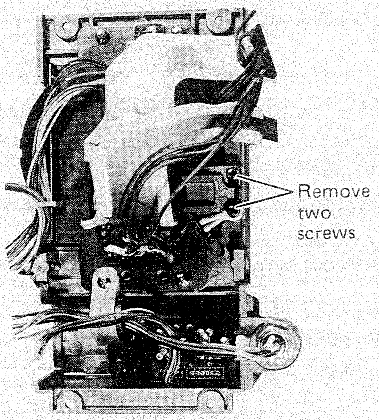

Remove
two
screws

Fig. 3-9

- After replacing the Prism and CCD assembly, assemble the camera in the reverse order of disassembly.

4. ADJUSTMENT PROCEDURE-1

4-1 Connection and Setting Up for Adjustment

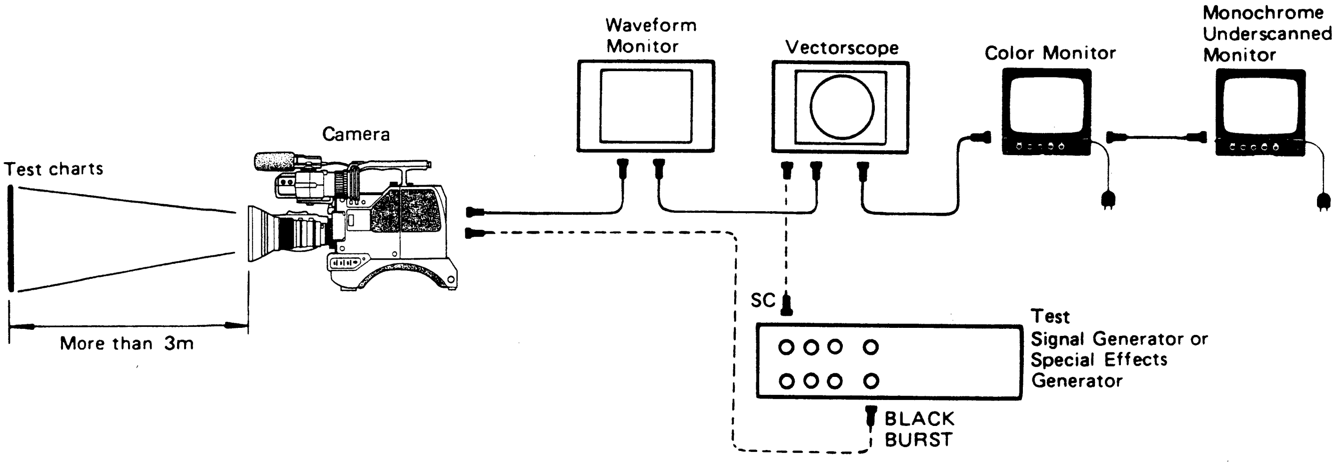


Fig. 4-1-1

Connection

- Connect the coaxial cable between the VIDEO OUTPUT connector on the right side (viewed from rear) of camera adaptor and the VIDEO INPUT connector of the waveform monitor.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the waveform monitor and the VIDEO INPUT connector of the vectorscope.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the vectorscope and the VIDEO INPUT connector of the color monitor.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the color monitor and the VIDEO INPUT connector of the monochrome underscanned monitor.
- Terminate the VIDEO INPUT connector of the monochrome underscanned monitor with 75 ohms.

Setup

- Turn on the camera for warming up at least 30 minutes prior to adjustment.
- Distance between the camera and test chart should be 3m.
- Lighting: 300 footcandles (3000 lux), incident, 3200°K.

Position of Controls and Switches on the Camera

(Left Side) Viewed from rear

• Filter Wheel	1
• High Gain Selection Switch	0 dB
• Color Bar/Camera Selection Switch	BAR
• White Balance Selection Switch	MANUAL
• Power Switch	ON

(Mother board)

• T PED	Center
• R GAIN	Center
• B GAIN	Center
• Shutter ON/OFF Switch	OFF
• Detail ON/OFF Switch	ON
• H PHASE	Center
• SC PHASE	Center
• SC PHASE COARSE SWITCH	2, 4
• Lens Iris Control	Center
• Level Indicator ON/OFF Switch	ON
• -6dB ON/OFF Switch	OFF

(Front)

• Auto White/Auto Black Set Switch	HOLD
• Lens Iris Selection Switch	NOR

(Right Side) Viewed from rear

• Power Selection Switch	BATT/EXT DC
• VTR Compatibility Switch	⊕1
• Audio Monitor/Intercom Level Control	Center
• Audio Level Selection Switch	-20
• VTR Video Output Selection Switch	ENC
• Audio Monitor Selection Switch	INT

(Lens)

• Iris Control Selection Switch	M (Manual)
• Servo/Manual Zoom Selection Switch	MANU

4-2 Adjustment

- Refer to the LOCATION OF TEST POINTS AND ADJUSTING CONTROLS.
- Aim the camera at the test chart so that the arrow heads on the test chart just touch to the four edges of the raster on the underscanned video monitor.

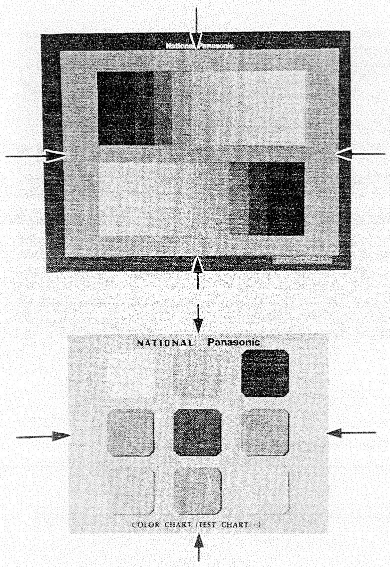

National Panasonic
NATIONAL Panasonic
COLOR CHART (TEST CHART)

Fig. 4-2-1

■ Extension Board

- When adjusting the Preamp/Drive, Process/Detail, Sync/Encoder, and Power/Auto board, use the following extension board.

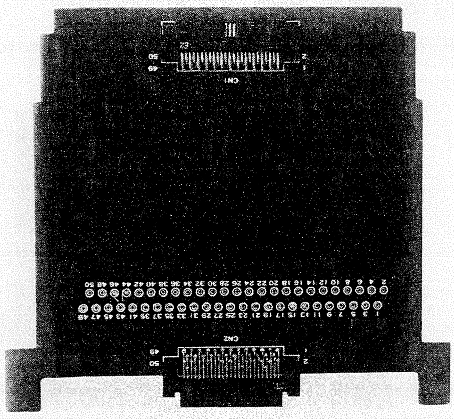


Fig. 4-2-2

■ Extension Cables

- When adjusting the Preamp/Drive board, use the following extension cables in addition to the extension board.

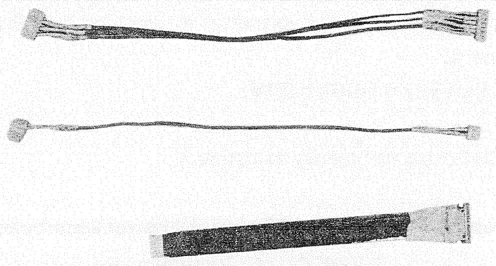
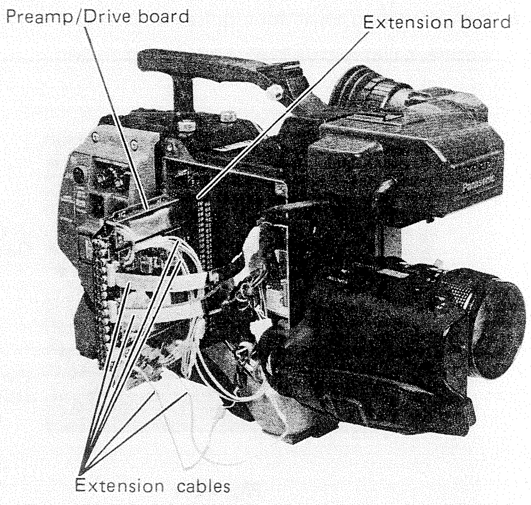


Fig. 4-2-3

- These extension cables can extend the cables from CN2 - CN7.


Preamp/Drive board
Extension board
Extension cables

■ Power/Auto Board Adjustment

(1) +8.8V adjustment

Test Points : Pin 1 or 2 of Extension board
Adjusts : VR3 (+8.8V ADJ) Power/Auto board

- Connect the digital voltmeter to pin 1 or 2 of Extension board.
- Adjust VR3 for 8.8V ± 0.1V.

(2) Switching frequency adjustment

Test points : Drain of Q37 Power/Auto board
Pin 46(CP) of Extension board
Adjust : VR4 (SW FREQ ADJ) Power/Auto board

- Connect 2 probes of the oscilloscope to Drain of Q37 and pin 46 (CP) of Extension board.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR4 so that four pulses at Drain of Q37 are put between clamp pulses as shown in Fig. 4-2-4

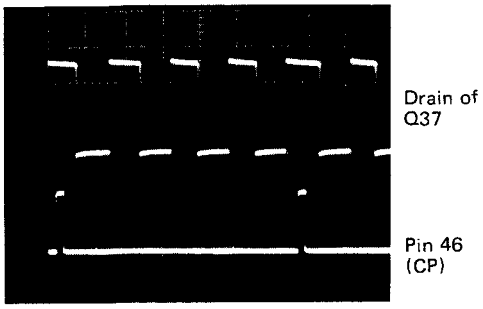


Fig. 4-2-4

■ Sync/Encoder Board Adjustment

(3) Internal subcarrier adjustment

Testpoint: TP7 (SC) Sync/Encoder board
Adjust: CT3 (SC FREQ ADJ) Sync/Encoder board

- Connect the frequency counter to TP7.
- Adjust CT3 for 4.43361875MHz ± 5Hz(PAL) or 3.579545MHz ± 5Hz(NTSC).

(4) Interleaving adjustment (PAL only)

Test point : TP4 (INTER LEAVING) Sync/Encoder board
Adjust : CT1 (INTERLEAVING) Sync/Encoder board

- Connect the oscilloscope to TP4.
- Set the oscilloscope to DC mode.
- Adjust CT1 so that the DC voltage becomes 2.5V ± 0.1V.

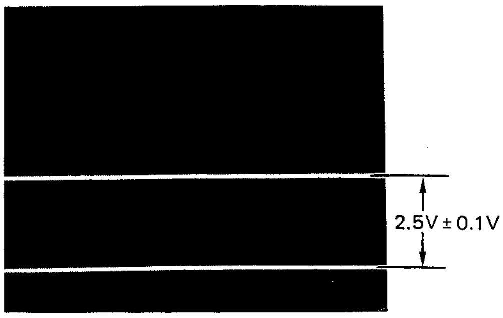


Fig. 4-2-5

- Reset the oscilloscope to AC mode.

(5) Vertical drive width adjustment (PAL only)

Test points : Pin 42 (VD OUT) of Extension board
Pin 34 (C SYNC OUT) of Extension board
Adjust : VR23 (VD WIDTH) Sync/Encoder board

- Connect 2 probes of the oscilloscope to pins 42 (VD OUT) and 34 (C SYNC OUT) of Extension board.
- Trigger the oscilloscope at V rate with using TP2 (VS) on the Mother board.
- Adjust VR23 so that Ⓐ becomes 2.5H as shown in Fig.4-2-6.

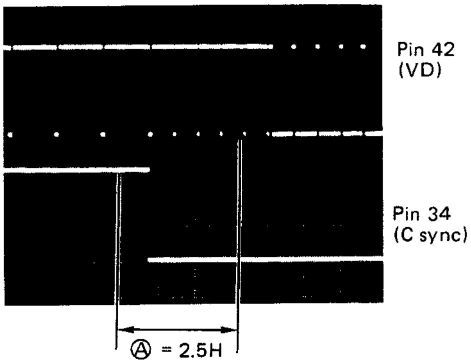


Fig. 4-2-6

(6) H. phase adjustment

Test points : Pin28 (G/L VIDEO) of Extension board
VIDEO OUTPUT Connector
Adjusts : VR5 (H PHASE) Mother board
VR7 (H PHASE LIMIT)

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the Test Signal Generator or S.E.G.
- Connect the 2 probes of the oscilloscope to pin28 (G/L VIDEO) of Extension board and VIDEO OUTPUT Connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on Mother board.
- Set the oscilloscope to H rate and dual display.
- Expand the H sync period on the oscilloscope.

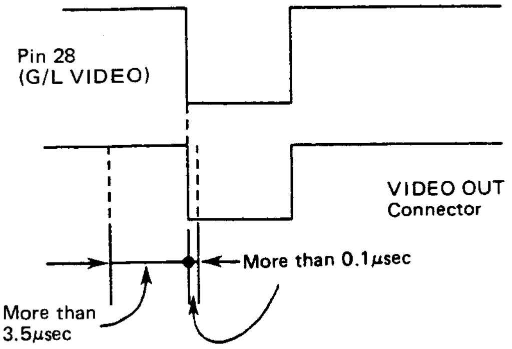


Fig. 4-2-7

- Confirm that the sync of gen-lock signal at pin28 (G/L VIDEO) of Extension board lags more than 3.5 µsec sync signal at VIDEO OUTPUT connector when turning VR5 fully counter clockwise.
- Reset VR5 fully clockwise.
- Adjust VR7 so that the sync of gen-lock signal at pin28 (G/L VIDEO) of Extension board leads by 0.1µsec..

(7) Subcarrier phase adjustment

Adjusts :	**VR4 (SC PHASE)**	**Mother board**
	VR8 (SC PHASE LIMIT)	**Mother board**
	SW7 **(SC PHASE COARSE-1 SWITCH)**	**Mother board**
	SW8 **(SC PHASE COARSE-2 SWITCH)**	**Mother board**
Observe :	**Vectorscope**	

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the Test Signal Generator or S.E.G.
- Supply an external subcarrier signal to the external subcarrier reference (EXT CW øREF) connector of the vectorscope from the Test Signal Generator or S.E.G.
- Set the burst mode (øREF) of the vectorscope to EXT position.
- Set SW7 and SW8 to the position where variable range of phase becomes minimum.
- Turn VR4 fully counter clockwise.
- Adjust phase control of vectorscope so that burst phase positions 0° (U axis).

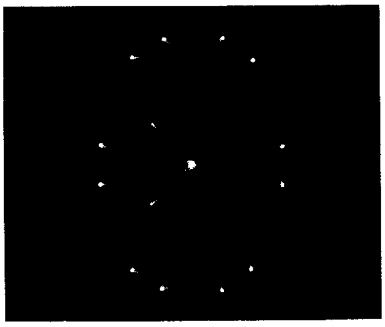


Fig. 4-2-8

- Turn VR4 fully clockwise.
- Adjust VR8 so that burst phase delays 93° as shown in Fig.4-2-9.

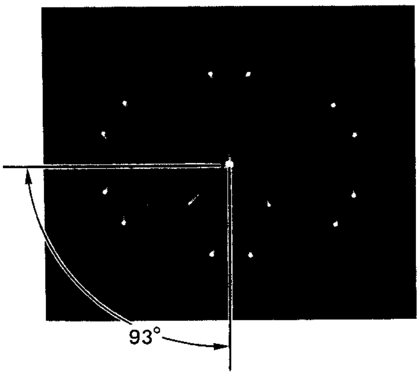


Fig. 4-2-9

- Set SW7 and SW8 to 0° position.
- Confirm that the burst phase changes more than 90°, 180° and 270° when SW7 and SW8 are set to 90°, 180° and 270° position.
- Confirm that the burst phase changes 90° when VR4 is turned back.
  (The burst phase changes more than 360° by setting SW7, SW8 and VR4.)
- Reset SW7 and SW8 to 0° position and return VR4 to its mechanical center.
- Disconnect the black burst signal or color bar signal from the GEN-LOCK INPUT connector, and the external subcarrier signal from the vectorscope.

(8) Color bar adjustment

Test point : Pin20 (Y OUT) of Extension board
Adjusts : VR7 (BAR WIDTH) Sync/Encoder board
Observe : Oscilloscope

- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Connect the oscilloscope to pin 20 of Extension board.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR7 so that the width of black bar portion becomes 5.5 µsec.

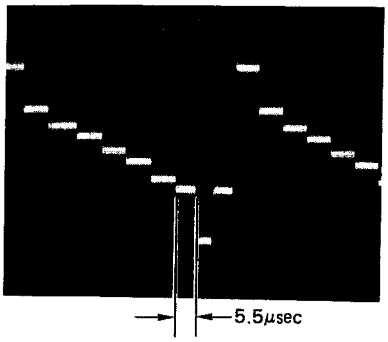


Fig. 4-2-10

(9) U/V (B-Y/R-Y) black balance/white balance adjustment

Test point : VIDEO OUTPUT connector
Adjusts : VR14
(PAL...U CARRIER BAL) Sync/Encoder board
(NTSC..B-Y CARRIER BAL) Sync/Encoder board
VR15
(PAL...V CARRIER BAL) Sync/Encoder board
(NTSC..R-Y CARRIER BAL) Sync/Encoder board
VR9
(PAL...U WHITE BAL) Sync/Encoder board
(NTSC..B-Y WHITE BAL) Sync/Encoder board
VR11
(PAL.....V WHITE BAL) Sync/Encoder board
(NTSC..R-Y WHITE BAL) Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Adjust VR14 and VR15 alternately so that the carrier on the black level becomes minimum.
- Adjust VR9 and VR11 alternately so that the carrier on the white level becomes minimum.

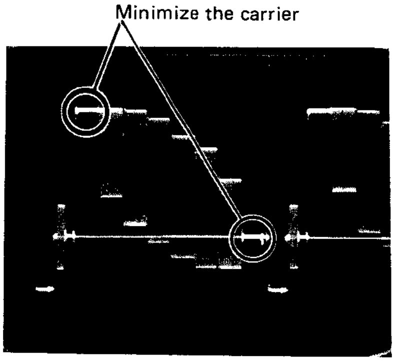


Fig. 4-2-11

(10) Bar pedestal, Sync level and Y gain adjustment

Test point : VIDEO OUTPUT connector
Adjusts : VR13 (BAR SETUP) Sync/Encoder board
VR18 (TOTAL Y GAIN) Sync/Encoder board
VR8 (Y GAIN) Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother Board.
- Adjust VR18 so that the sync level becomes 0.3 ± 7mV (PAL) or 40 IRE ± 1 IRE (NTSC).
- Adjust VR13 so that the setup level (black level) becomes 0V (PAL) or 7.5 IRE ± 1 IRE (NTSC).
- Adjust VR8 so that the white bar signal level becomes 0.7 ± 7mV (PAL) or 77 IRE ± 1 IRE (NTSC).

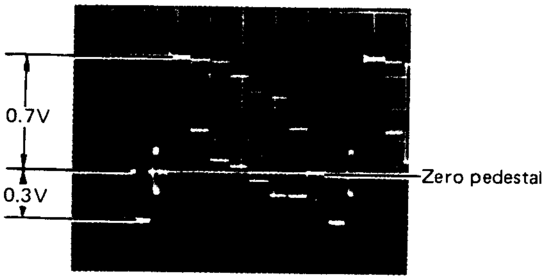


Fig. 4-2-12

(11) Chroma adjustment (PAL model)

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR16 (U BURST GAIN)**	**Sync/Encoder board**
	VR17 (V BURST GAIN)	**Sync/Encoder board**
	VR10 (U GAIN)	**Sync/Encoder board**
	VR12 (V GAIN)	**Sync/Encoder board**
	VR1 (BAR PHASE-1)	**Sync/Encoder board**
	VR5 (BAR PHASE-2)	**Sync/Encoder board**
Observe :	**Vectorscope**	

- Adjust VR16 so that the phase difference between the burst vectors for odd and even line becomes 90° on the vectorscope.
- Adjust VR17 so that the burst vector becomes 75% position on the 135° and 225° axis.

- Adjust VR10, VR12, VR1 and VR5 so that all vectors fall into their respective boxes.

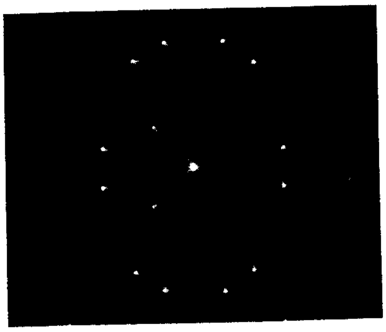


Fig. 4-2-13

- Repeat above steps so that all vectors fall into their respective boxes.

(12) Chroma adjustment (NTSC model)

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR16 (BURST PHASE)**	**Sync/Encoder board**
	VR17 (BURST GAIN)	**Sync/Encoder board**
	VR10 (B-Y GAIN)	**Sync/Encoder board**
	VR12 (R-Y GAIN)	**Sync/Encoder board**
	VR1 (BAR PHASE-1)	**Sync/Encoder board**
	VR3 (BAR PHASE-2)	**Sync/Encoder board**

- Adjust VR17 so that the burst vector becomes 75% position on the 180°axis.
- Adjust VR10, VR12, VR1 and VR3 so that all vectors fall into their respective boxes.
- Adjust VR16 so that the burst vector places on the 180° axis.

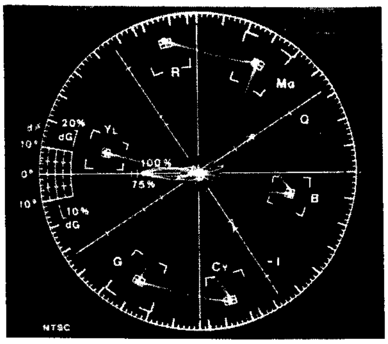


Fig. 4-2-14

- Repeat above steps so that all vectors fall into their respective boxes.

(13) Camera chroma gain adjustment

Test point :	**VIDEO OUTPUT connector**	
Adjust :	**VR22**	**Sync/Encoder board**
	(PAL ... U SUB GAIN)	
	(NTSC . B-Y SUB GAIN)	

- Set the BAR/CAMERA MOD switch SW2 on the Sync/Encoder board to CAM position.
- Adjust gain control of vectorscope so that red and magenta vectors fall into their respective boxes.
- Adjust VR22 so that yellow and blue vectors fall into their respective boxes.

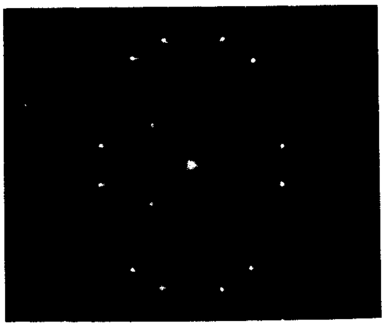


Fig. 4-2-15

- Reset the BAR/CAMERA MOD switch SW2 on the Sync/Encoder board to BAR position.

(14) Horizontal lock adjustment

Test point :	**TP3 (H LOCK)**	**Sync/Encoder board**
Adjust :	**L9 (H LOCK)**	**Sync/Encoder board**

- Supply the black burst signal or color bar signal to GEN-LOCK INPUT connector on the camera adaptor from Test signal generator or S.E.G.
- Connect the oscilloscope to TP3.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust L9 so that the DC voltage becomes 2.5V ± 0.1V.

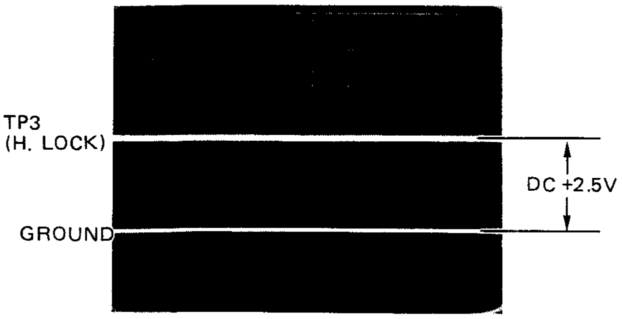


Fig. 4-2-16

(15) Color lock adjustment

Test point :	**TP5 (SC LOCK)**	**Sync/Encoder board**
Adjust :	**CT2 (SC LOCK)**	**Sync/Encoder board**

- Supply the black burst signal or color bar signal to GEN-LOCK input connector on the camera adaptor from Test signal generator or S.E.G.
- Connect the oscilloscope to TP5.
- Adjust CT2 so that the DC voltage becomes 2.5V ± 0.1V.
- If DC voltage does not become 2.5V, turn L8 on Sync/Encoder board a little so that it becomes 2.5V.

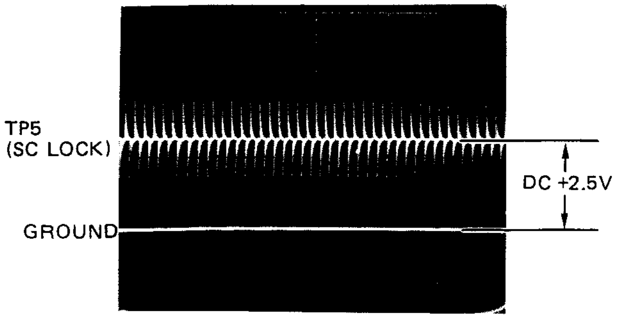


Fig. 4-2-17

(16) Flange-back adjustment (Lens)

Adjust :	**Flange-back adjustment ring**
Observe :	**Monochrome underscanned video monitor**

- Set the wheel to 1 (3200°K) position.
- Loosening the flange-back lock knob.
- Set the lens iris to fully open in order to have minimum depth of focus. If the picture on the monochrome underscanned video monitor is saturated. Set the filter wheel to 2 (5600°K + 12.5% ND) position.
- Aim the camera at the resolution chart further than 10 feet (3m) from the camera.
- Zoom in (close up) and adjust lens focus while observing the monochrome underscanned video monitor.
- Zoom out (wide angle) and adjust the focus by turning the flange-back adjustment ring.
- Zoom in again and adjust the lens focus by turning the focus ring.
- Zoom out again and if necessary adjust the focus with the flange-back adjustment ring.
- Repeat this procedure until correct focus is maintained throughout the entire zoom range. When the adjustment has been completed, tighten the flange-back lock knob.

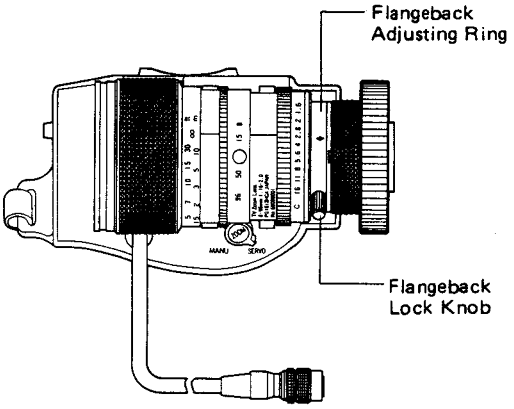


Fig. 4-2-18

■ Preamp/Drive Board Adjustment

(17) PLL (Phase Lock Loop) adjustment

Test point :	**TP105 (PLL)**	**Preamp/Drive board**
Adjust :	**L113 (PLL LOCK)**	**Preamp/Drive board**

- For this adjustment, refer to 2-1-2 Preamp/Drive board as shown on page 2-1 for disassembling.
- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to RGB position.
- Set the color Bar/Camera selection switch on the left side of the camera to CAM position.
- Connect the oscilloscope to TP105.
- Adjust L113 so that the DC voltage becomes 2.5V ± 0.1V.

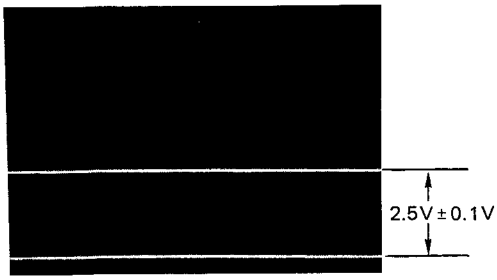


Fig. 4-2-19

- After finishing this adjustmet, turn off the power and remove Extension board and Extension cables.
- Return the Preamp/Drive board into the camera.
- Turn on the Power.
- Turn VR6 (Y BLACK CLIP) and VR8 (Y WHITE CLIP) on the Preamp/Drive board fully counter clockwise.

(18) C Sub adjustment

Observe :	**Video monitor**	
Adjust :	**VR103 (C SUB)**	**Preamp/Drive board**

- Set the Iris Control Selection Switch to A (Auto) position .
- Aim the camera at the 60-watt lamp placed in front of the dark background.

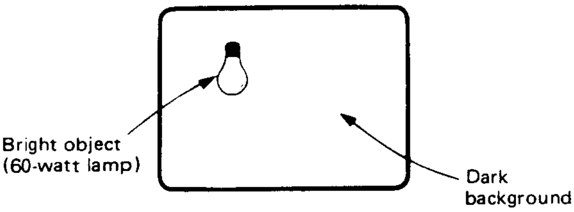
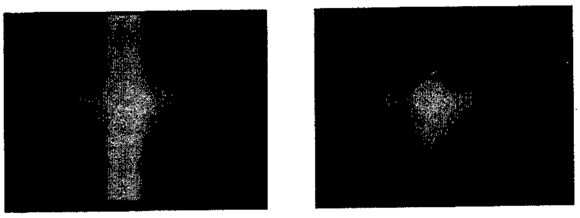


Fig. 4-2-20

- Adjust VR103 so that the smear on the monitor just disappear.



NO GOOD GOOD

Fig.4-2-21

(19) C output gate adjustment

Test point :	**TP102 (C OG)**	**Preamp/Drive board**
Adjust :	**VR104 (C OG)**	**Preamp/Drive board**

- Set the filter wheel to 4 (CLOSE) position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP102 and set to DC mode.
- Adjust VR104 for 8.5V.

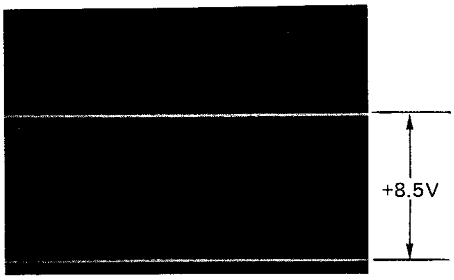


Fig. 4-2-22

(20) Y Sub adjustment

Observe :	**Video monitor**	
Adjust :	**VR101 (Y SUB)**	**Preamp/Drive board**

- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to YC position.
- Set the Iris Control Selection Switch to A(Auto) position.
- Aim the camera at the 60-watt lamp placed in front of the dark background.

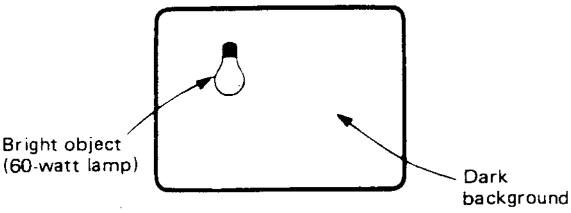


Fig. 4-2-23

- Adjust VR101 so that the smear on the monitor just disappear.

NO GOOD GOOD

Fig. 4-2-24

(21) Y output gate adjustment

Test point :	**TP101 (Y OG)**	**Preamp/Drive board**
Adjust :	**VR102 (Y OG)**	**Preamp/Drive board**

- Set the filter wheel to 4 (CLOSE) position.
- Connect the oscilloscope to TP101 and set to DC mode.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR102 for 8.5V.

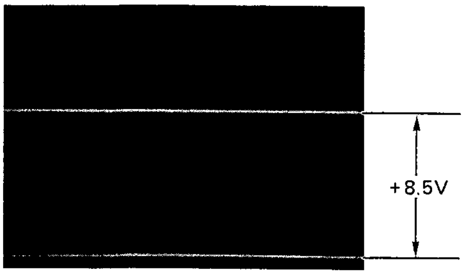


Fig. 4-2-25

■ Process/Detail Board Adjustment

IMPORTANT NOTICE
Preset the memory in the POWER/AUTO board, short TP1 (P ROM RESET 1) and TP2 (P ROM RESET 2), also short TP3 (AUTO RESET 1) and TP4 (AUTO RESET 2) on the POWER/AUTO board for the following adjustment and do not set the Auto White and Black Balance setting switch (AWC, ABC) on the front panel throughout the adjustment.

(22) R/G/B Pulse cancel and pedestal adjustment

Test points :	**TP12 (G OUT)**	**Process/Detail board**
	TP11 (R OUT)	**Process/Detail board**
	TP20 (B OUT)	**Process/Detail board**
Adjusts :	**VR3 (G PUL CAN)**	**Process/Detail board**
	VR16 (G PED)	**Process/Detail board**
	VR1 (R PUL CAN)	**Process/Detail board**
	VR15 (R PED)	**Process/Detail board**
	VR5 (B PUL CAN)	**Process/Detail board**
	VR17 (B PED)	**Process/Detail board**

- Set the RGB/YC selection switch SW1 on the Sync/Encoder board to RGB position.
- Set the filter wheel to 4 (CLOSE) position.
- Confirm that the T PED control VR1 on the Mother board is set to its mechanical center.

■ G pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP12.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.
- Set the High Gain Selection Switch to OdB.
- Preset VR16 so that the pedestal level of G signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR3 so that the pedestal level of G signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between OdB and +18dB position.
- Set the High Gain Selection Switch to OdB position.
- Adjust VR16 so that the pedestal level of G signal becomes 40mV (PAL) or 20mV (NTSC).

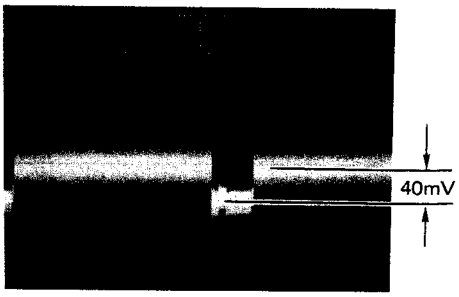


Fig. 4-2-26

■ R pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP11.
- Preset VR15 so that the pedestal level of R signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR1 so that the pedestal level of R signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between OdB and +18dB position.
- Set the High Gain Selection Switch to OdB position.
- Adjust VR15 so that the pedestal level of R signal becomes 40mV (PAL) or 20mV (NTSC).

■ B pulse cancel and pedestal adjustment

- Connect the oscilloscope to TP20.
- Preset VR17 so that the pedestal level of B signal becomes 40mV (PAL) or 20mV (NTSC).
- Adjust VR5 so that the pedestal level of B signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between 0dB and + 18dB position.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR17 so that the pedestal level of B signal becomes 40mV (PAL) or 20mV (NTSC).
- Set the filter wheel to 1 (3200°K) position.
- Turn VR7 (R PRE-KNEE), VR8 (G PRE-KNEE), VR9 (B PRE-KNEE), VR26 (HIGH GAIN LEVEL DEPENDENT) and VR30 (DTL GAIN) on the Process/Detail board fully clockwise.
- Turn VR11 (R/G/B WHITE CLIP), VR25 (LEVEL DEPENDENT) and VR29 (NOISE SUPPRESS) on the Process/Detail board fully counter clockwise.

(23) R/G/B Input gain adjustment

Test points :	**Pin 1 (Y) of CN 6**	**Preamp/Drive board**
	TP12 (G OUT)	**Process/Detail board**
	TP11 (R OUT)	**Process/Detail board**
	TP20 (B OUT)	**Process/Detail board**
Adjusts :	**VR4 (G INPUT GAIN)**	**Process/Detail board**
	VR2 (R INPUT GAIN)	**Process/Detail board**
	VR6 (B INPUT GAIN)	**Process/Detail board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.
- Adjust the lens iris so that the Y signal level becomes 100mVp-p and keep this condition until the adjustment is completed.

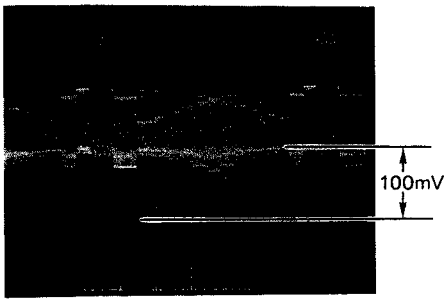


Fig. 4-2-27

- Connect the oscilloscope to TP12.
- Adjust VR4 so that the G signal at TP12 becomes 0.7Vp-p.

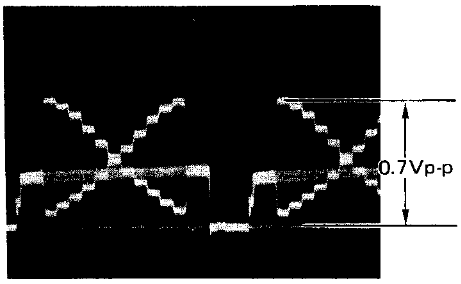


Fig. 4-2-28

- Connect the oscilloscope to TP11.
- Adjust VR2 so that the R signal becomes 0.7Vp-p.
- Connect the oscilloscope to TP20.
- Adjust VR6 so that the B signal becomes 0.7Vp-p.

(24) R/G/B Gamma adjustment

Test point : VIDEO OUTPUT connector
Adjusts : VR10 (R/G/B GAMMA) Process/Detail board

- Set the High Gain Selection Switch to 0 dB position.
- Aim the camera at the logarithmic gray scale chart.
- Confirm that the composite video signal level is 0.7V (PAL) or 100 IRE (NTSC). If not, readjust lens iris.
- While observing the oscilloscope, adjust VR10 so that the crosspoint level of the gray scale of the composite video signal becomes 350mV +0V, -14mV (PAL) or 50IRE ± IRE (NTSC).

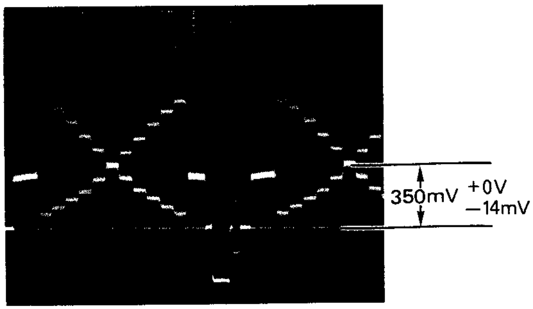


Fig. 4-2-29

- Confirm R/G/B pulse cancel, pedestal and input gain while referring to adjustment procedure items (22), (23).

(25) Matrix adjustment

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR18 (MATRIX LEVEL)**	**Process/Detail board**
	VR31 (MATRIX GAIN)	**Process/Detail board**
Observe :	**Vectorscope**	

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Aim the camera at color chart.
- Set Matrix ON/OFF switch SW1 on the Process/Detail board to ON position.
- Adjust lens iris so that white chip level of color chart on the oscilloscope becomes 700mV (PAL) or 714mV (NTSC).

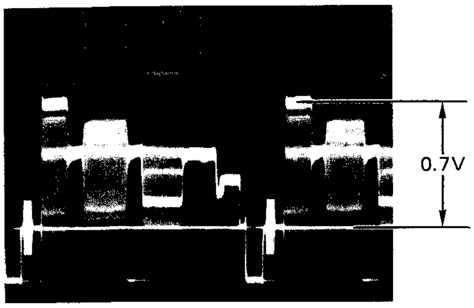


Fig. 4-2-30

- Adjust VR18 so that Red vector becomes 103° ± 1° on the vectorscope.

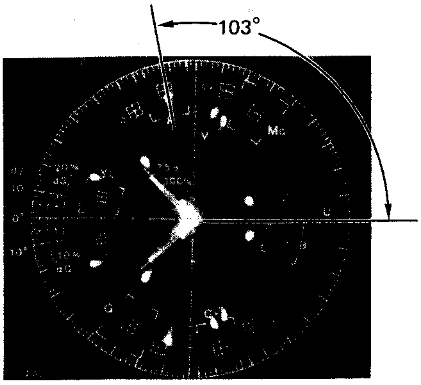


Fig. 4-2-31

- Aim the camera at logarithmic gray scale chart.
- Adjust VR31 so that carrier of composite video signal on the oscilloscope becomes minimum.

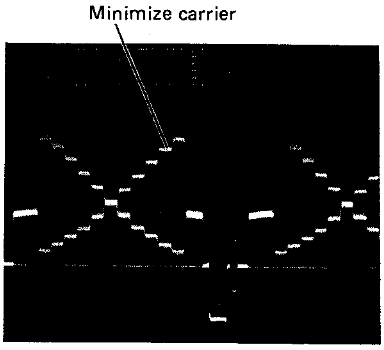


Fig. 4-2-32

(26) R/G/B Knee and white clip adjustment

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR8 (G PRE-KNEE)**	**Process/Detail board**
	VR7 (R PRE-KNEE)	**Process/Detail board**
	VR9 (B PRE-KNEE)	**Process/Detail board**
	VR11(R/G/B WHITE CLIP)	**Process/Detail board**
Observe :	**Vectorscope**	

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Adjust lens iris so that composite video signal on the oscilloscope becomes 700mV (PAL) or 714mV (NTSC) and note the F stop of lens iris as (A).
- Open the lens iris 1F stop from (A).
- Adjust VR8, VR7 and VR9 so that knee effects between 665mV and 840mV (PAL) or 678mV and 857mV (NTSC) and minimize the carrier of portion where knee effects.

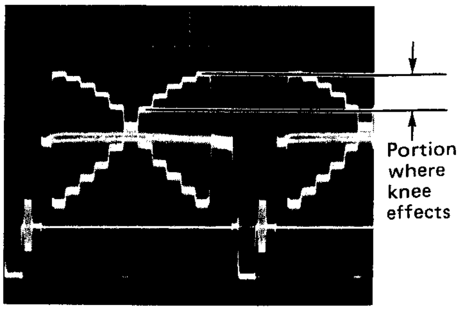


Fig. 4-2-33

- Open the lens iris.
- Adjust VR11 so that clip level of signal becomes 840mV (PAL) or 857mV (NTSC).

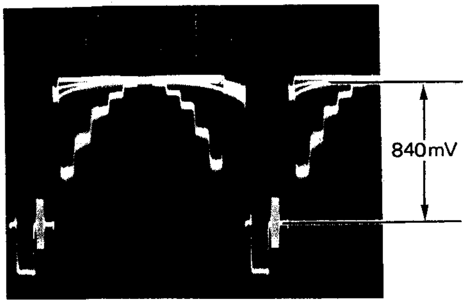


Fig. 4-2-34

(27) R/G/B white balance fine adjustment

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR15 (R PED)**	**Process/Detail board**
	VR17 (B PED)	**Process/Detail board**
	VR2 (R INPUT GAIN)	**Process/Detail board**
	VR6 (B INPUT GAIN)	**Process/Detail board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Fine-adjust VR15, VR17, VR2 and VR6 so that the carrier on the video signal becomes minimum.

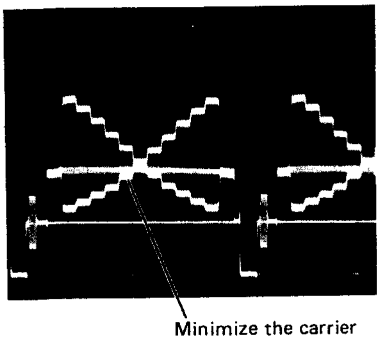


Fig. 4-2-35

(28) Y DC/Y input gain adjustment (Preamp/Drive board)

Test points :	**TP7 (Y DC)**	**Mother board**
	TP1 (Y)	**Preamp/Drive board**
Adjusts :	**VR301 (Y DC)**	**Preamp/Drive board**
	VR2 (Y INPUT GAIN)	**Preamp/Drive board**

- Set the RGB/YC Selection Switch SW1 on the Sync/Encoder board to YC position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on Mother board.
- Adjust the lens iris so that the Y signal level becomes 100mVp-p and keep this condition until the adjustment is completed.

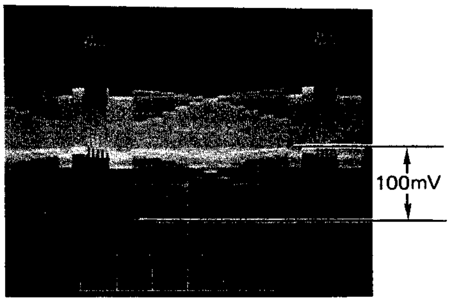


Fig. 4-2-36

- Connect the oscilloscope to TP7.
- Set the oscilloscope to DC mode.
- Adjust VR301 so that DC voltage becomes 0.5V.

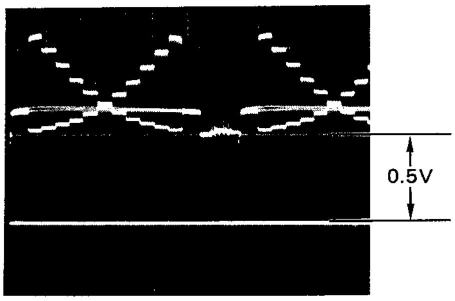


Fig. 4-2-37

- Connect the oscilloscope to TP1.
- Set the oscilloscope to AC mode.
- Adjust VR2 so that the Y signal becomes 0.4V.

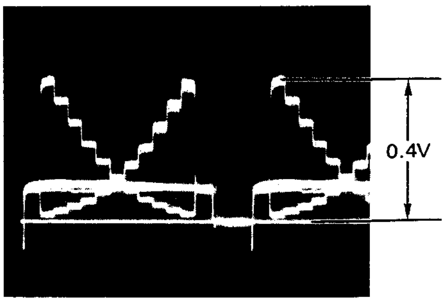


Fig. 4-2-38

(29) Y pulse cancel and pedestal adjustment (Preamp/Drive board)

Test point :	**Pin1 (Y) of CN6**	**Preamp/Drive board**
Adjusts :	**VR1 (Y PUL CAN)**	**Preamp/Drive board**
	VR9 (Y PED)	**Preamp/Drive board**
	VR10 (-6dB PUL CAN)	**Preamp/Drive board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1(HD) on the Mother board.
- Set the filter wheel to 4 (CLOSE) position.
- Preset VR9 so that the pedestal level of video signal becomes 35mV ± 7mV (PAL) or 54mV ± 7mV (NTSC).
- Adjust VR1 so that the pedestal level of video signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between OdB and + 18dB position.
- Set the -6dB ON/OFF Switch on the Mother board to ON position.
- Adjust VR10 so that the pedestal level of video signal is not varied (stayed in the same level) while changing the High Gain Selection Switch between OdB and +12dB position.
- Set the High Gain Selection Switch to OdB position.
- Set the -6dB ON/OFF Switch on the Mother board to OFF position.
- Adjust VR9 so that the pedestal level becomes 35mV ± 7mV (PAL) or 54mV ± 7mV (NTSC).

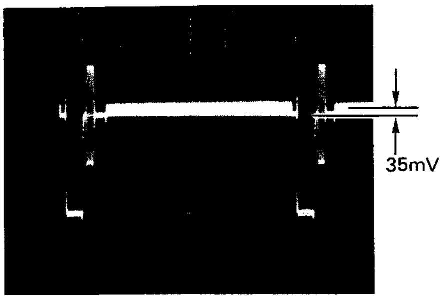


Fig. 4-2-39

(30) Y gamma and gain adjustment (Preamp/Drive board)

Test points :	**Pin1 (Y) of CN6**	**Preamp/Drive board**
	VIDEO OUTPUT connector	
Adjusts :	**VR4 (Y GAIN-1)**	**Preamp/Drive board**
	VR7 (Y GAMMA)	**Preamp/Drive board**

- Set the filter wheel to 1(3200°K) position.
- Connect the oscilloscope to pin1 (Y) of CN6 on the Preamp/Drive board.
- Trigger the oscilloscope at H rate using TP1 (HD) on the Mother board.
- Adjust the lens iris so that the Y signal level becomes 100mV and keep this condition until the adjustment is completed (refer to Fig. 4-2-36 on page 2-16).
- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Adjust VR4 and VR7 so that gain level becomes 700mV ± 7mV or 714mV ± 7mV (NTSC) and gamma level becomes 350mV +0V, -14mV (PAL) or 357mV ± 7mV (NTSC) on the oscilloscope.

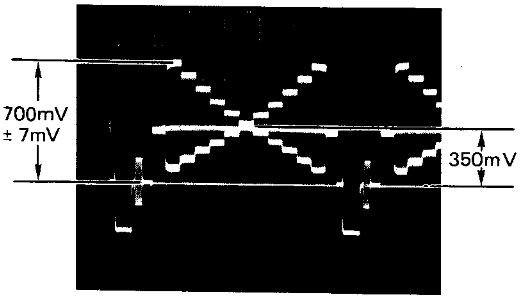


Fig. 4-2-40

(31) High Gain adjustment (Preamp/Drive board)

Test point :	**VIDEO OUTPUT connector**	
Adjust :	**VR5 (Y GAIN-2)**	**Preamp/Drive board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust lens iris so that video signal becomes 700mV (PAL) or 714mV (NTSC).
- Set the High Gain Selection Switch to + 18dB position.
- Place the 1/8 ND filter in front of the lens.
- Adjust VR5 so that video signal becomes 700mV ± 7mV (PAL) or 714mV ± 7mV (NTSC).

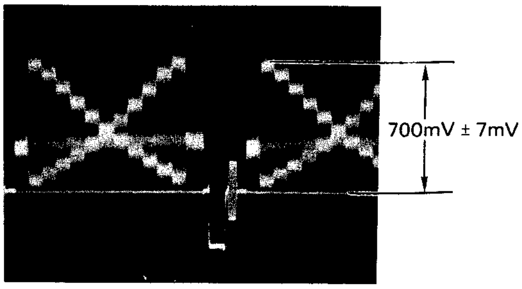


Fig. 4-2-41

- Set the High Gain Selection Switch to OdB position and remove 1/8 ND filter.

(32) Y white clip adjustment (Preamp/Drive board)

Test point :	**VIDEO OUTPUT connector**	
Adjusts :	**VR8 (Y WHITE CLIP)**	**Preamp/Drive board**
	VR3 (Y PRE WHITE CLIP)	**Preamp/Drive board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Aim the camera at logarithmic gray scale chart.
- Open the lens iris.
- Set the High Gain Selection Switch to 0dB position.
- Adjust VR8 so that clip level of signal becomes 770mV (PAL) or 785mV (NTSC).

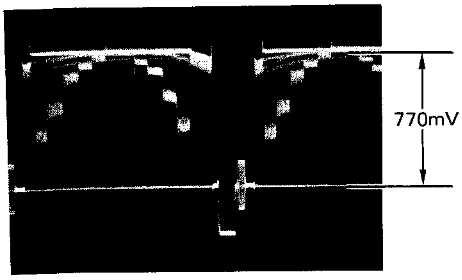


Fig. 4-2-42

- Set the High Gain Selection Switch to + 18dB position.
- Adjust VR3 so that clip level of signal becomes 840mV (PAL) or 857mV (NTSC).

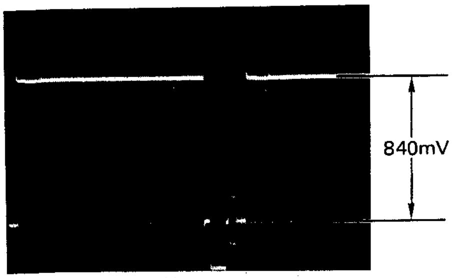


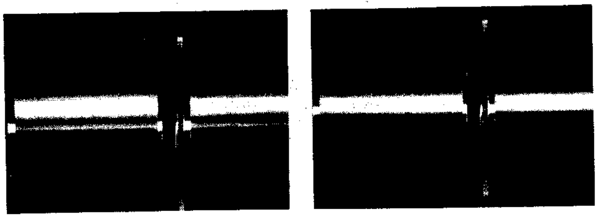
Fig. 4-2-43

- Repeat above adjustment clip level at 0dB is maintained between 770mV and 800mV (PAL) or 785mV and 821mV (NTSC), and clip level at +18dB is maintained between 800mV and 840mV (PAL) or 821mV and 857mV (NTSC).

(33) Black clip adjustment (Preamp/Drive board)

Test point :	**VIDEO OUTPUT connector**	
Adjust :	**VR6 (Y BLACK CLIP)**	**Preamp/Drive board**

- Set the filter wheel to 4 (CLOSE) position.
- Adjust VR6 so that video signal is just clipped.



GOOD NO GOOD

Fig. 4-2-44

(34) 1H CCD bias level adjustment

Test points :	**TP14 (0H Y)**	**Process/Detail board**
	TP19 (1H BIAS)	**Process/Detail board**
Adjusts :	**VR19 (1H CCD BIAS)**	**Process/Detail board**
	VR20 (1H CCD GAIN)	**Process/Detail board**

- Set the filter wheel to 1(3200°K) position.
- Aim the camera at in-mega cycle chart.
- Connect the oscilloscope to TP14.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust lens iris so that signal becomes 0.2V, and keep this condition until the adjustment (34), (35) are completed.

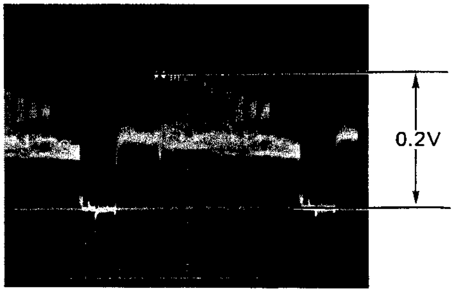
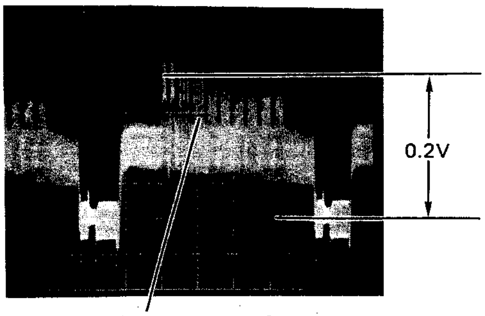


Fig. 4-2-45

- Connect the oscilloscope to TP19.
- Adjust VR19 so that amplitude of entire frequency range becomes maximum.
- Adjust VR20 so that signal becomes 0.2V.



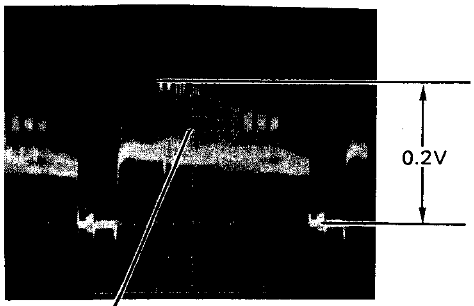
Maximize entire frequency range

Fig. 4-2-46

(35) 2H CCD bias level adjustment

Test point :	**TP17 (2H BIAS)**	**Process/Detail board**
Adjusts :	**VR22 (2H CCD BIAS)**	**Process/Detail board**
	VR21 (2H CCD GAIN)	**Process/Detail board**

- Aim the camera at in-mega cycle chart.
- Connect the oscilloscope to TP17.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Adjust VR22 so that amplitude of entire frequency range becomes maximum.
- Adjust VR21 so that signal becomes 0.2V.



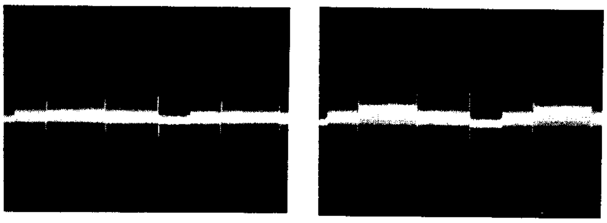
Maximize entire frequency range

Fig. 4-2-47

(36) H aperture balance/aperture symmetry adjustment

Test points :	**TP18 (DETAIL)**	**Process/Detail board**
	VIDEO OUTPUT connector	
Adjusts :	**VR24 (APERTURE BAL)**	**Process/Detail board**
	VR32 (H APERTURE SYMMETRY)	**Process/Detail board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Aim the camera at the window (white set) chart and adjust the lens iris so that the white level of the window chart on video signal becomes 560mV (PAL) or 571mV (NTSC) and keep this condition until the adjustments (36), (37) are completed.
- Connect the oscilloscope to TP18.
- Turn VR24 to its mechanical center.
- Adjust VR32 and VR24 so that the video signal is canceled and aperture signal levels become equal.



GOOD **NO GOOD**

Fig. 4-2-48

(37) 1H output level adjustment

Test point :	**TP16 (1H Y)**	**Process/Detail board**
Adjust :	**VR23 (OUTPUT LEVEL)**	**Process/Detail board**

- Connect the oscilloscope to TP16.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother bord.
- Adjust VR23 so that the signal level becomes 600mVp-p.

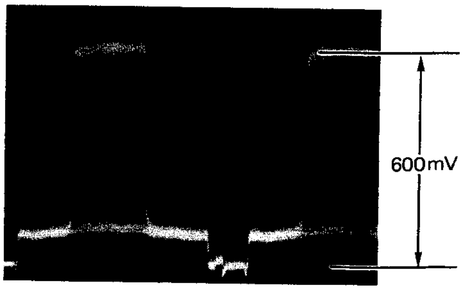
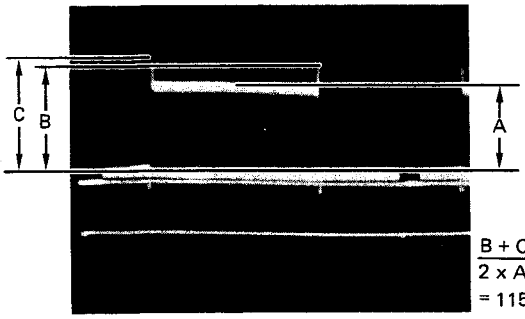


Fig. 4-2-49

(38) Total aperture level adjustment

Test point: **VIDEO OUTPUT connector**
Adjust: **VR30 (DTL GAIN)** **Process/Detail board**

- Set the filter wheel to 1 (3200°K) position.
- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at V rate with using TP2 (VS) on the Mother board.
- Set the High Gain Selection Switch to 0dB position.
- Turn VR27 (GAIN-1 NOISE SUPPRESS) and VR28 (GAIN-2 NOISE SUPPRESS) fully counter clockwise.
- Aim the camera at the window chart and adjust lens iris so that the white level becomes 490mV (PAL) or 500mV (NTSC)
- Confirm that the Detail ON/OFF Switch SW5 on the Mother board is set to ON position.
- Adjust VR30 so that the average of left and right vertical aperture signal levels becomes 115% ± 5% of the white level.



$$\frac{B+C}{2 \times A} \times 100\% = 115\% \pm 5\%$$

Fig. 4-2-50

(39) Level dependent adjustment

Test point: **VIDEO OUTPUT connector**
Adjust: **VR25 (LEVEL DEPENDENT)**
Process/Detail board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Trigger the oscilloscope at H rate with using TP1 (HD) on the Mother board.
- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Aim the camera at the logarithmic gray scale chart and adjust lens iris so that the white level becomes 700mV (PAL) or 714mV (NTSC)
- Adjust VR25 so that the aperture signal on the lowest step of gray scale signal only is suppressed.

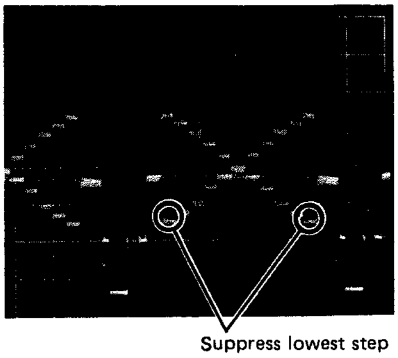


Fig. 4-2-51

(40) Auto white control and auto black control adjustment (Power/Auto board)

Test point: **VIDEO OUTPUT connector**
Adjusts: **VR1 (AWC/ABC ADJ1)** **Power/Auto board**
VR2 (AWC/ABC ADJ2) **Power/Auto board**

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Set the filter wheel to 1 (3200°K) position.
- Aim the camera at the logarithmic gray scale chart.
- Set the White Balance Selection Switch to A or B of AWC position.
- Adjust lens iris to that video signal becomes 700mV (PAL) or 714mV (NTSC).
- Connect the vectorscope to VIDEO OUTPUT connector.
- Set the gain of vectorscope to maximum.
- Press up the Auto White/Auto Black Set Switch on the front of camera to AWC position.
- Press up again the Auto White/Auto Black Set Switch on the front of camera to AWC position and press MOD Switch SW1 on the Power/Auto board at same time.
- Adjust VR1 and VR2 so that the vector positions at the center of the vectorscope.

Fig.4-2-52

- Press the MOD Switch SW1 on the Power/Auto board again.
- Set the filter wheel to 4 (CLOSE) position.
- Press down the Auto White/Auto Black Set Switch on the front of camera to ABC position.
- Press down again the Auto White/Auto Black Set Switch on the front of camera to ABC position and press MOD Switch SW1 on the Power/Auto board at same time.
- Adjust VR1 and VR2 so that the vector positions at the center of the vector scope.
- Press MOD Switch SW1 on the Power/Auto board again.
- Repeat above procedure until the vector is maintained at the center of the vectorscope when setting the Auto white/Auto Black Set Switch to both AWC and ABC positions.

(41) Level indicator adjustment (Sync/Encoder board)

Test point : VIDEO OUTPUT connector
Adjust : VR19 (ZEBRA LEVEL) Sync/Encoder board
Observe : Viewfinder

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Aim the camera at the logarithmic gray scale chart.
- Confirm that Level Indicator ON/OFF Switch on the Mother board is set to ON position.
- Set the lens iris so that the white level becomes 700mV (PAL) or 714mV (NTSC)
- Adjust VR19 so that the white chip (top step) of the logarithmic gray scale turns into ZEBRA pattern on the view finder.
- Set the lens iris so that white level becomes 665mV (PAL) or 678mV (NTSC).
- Confirm that the white chip (top step) of the logarithmic gray scale does not turn into ZEBRA pattern on the viewfinder.
- If the ZEBRA pattern appears, re-adjust VR19 until the white chip (top step) of the logarithmic gray scale turns into ZEBRA pattern at 700mV (PAL) or 714mV (NTSC) and does not turn into ZEBRA pattern at 665mV(PAL) or 678mV (NTSC).

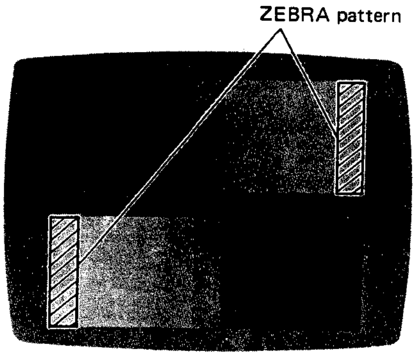


Fig. 4-2-53

(42) Character size adjustment (Power/Auto board)

Adjust: CT1 (CHARACTER POSITION)
Power/Auto board
Observe : 1.5" viewfinder

- Set the filter wheel to 4 (CLOSE) position.
- Observe 1.5" viewfinder screen.
- Adjust CT1 for making space corresponding to one character at right side of character "DB" while pressing the Check button on the left side of camera.

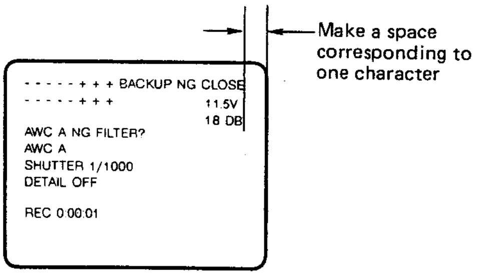


Fig. 4-2-54

4-3 Camera Adaptor Adjustment

- The camera must be completely aligned before Camera Adaptor adjustment is made.
- Disassemble the Camera Adaptor while referring to 2-2 Camera Adaptor on page 2-2.
- Refer to the separate booklet for the Test Points and Adjusting Controls.
- Connect the Camera Adaptor to the camera head.
- Connect the camera and the remote control unit (RCU) using 32 pin camera cable 32A-25.

Position of Controls and Switches on the Camera

<Left Side> Viewed from rear

• Filter Wheel	1
• High Gain Selection Switch	0 dB
• Color Bar/Camera Selection Switch	BAR
• White Balance Selection Switch	MANUAL
• Power Switch	ON

<Mother board>

• T PED	Center
• R GAIN	Center
• B GAIN	Center
• Detail Level Selection Switch	ON
• Shutter ON/OFF Switch	OFF
• H PHASE	Center
• SC PHASE	Center
• Lens Iris Control	Center

Level Indicator ON/OFF Switch	ON
-6dB ON/OFF Switch	OFF

<Front>

Auto White/Auto Black Set Switch	HOLD
Lens Iris Selection Switch	NOR

<Right Side> Viewed from rear

Power Selector Switch	VCR/RCU
VTR Compatibility Switch	⊕1
Audio Monitor/Intercom Level Control	Center
Audio Level Selection Switch	-20
VTR video Output Selection Switch	ENC
Audio Monitor Selection Switch	INT

<Lens>

Iris Control Selection Switch	A (Auto)
Servo/Manual Zoom Selection Switch	MANUAL

Position of Controls and Switches on the RCU

Power Switch	ON
High Gain Selection Switch	0 dB
Auto White/Auto Black Set Switch	HOLD
White/Black Balance Selection Switch	MANUAL
R GAIN	Center
B GAIN	Center
Detail ON/OFF Switch	OFF
Cable Length Compensation Switch	50m (150ft)
Intercom Level Control	Center
Color Bar/Camera Selection Switch	BAR
H PHASE	Center
SC PHASE FINE	Center
SC Phase Coarse Switch	0°
TOTAL PEDESTAL	Center
R PEDESTAL	Center
B PEDESTAL	Center
Y ADJUST	Center
CHROMA ADJUST	Center
Lens Iris Control	AUTO

(1) +9V adjustment

Test point: **TP1 (+9V)**
Adjust: **VR1 (+9V ADJ)**

- Connect the digital voltmeter to TP1.
- Adjust VR1 for 9V ± 0.05V.

4-4 Lens Adjustment

- The camera must be completely aligned before 12X Servo Control Zoom Lens WV-LZ70/12 adjustment is made.
- Disassemble the WV-LZ70/12 while referring to 2-3 12X Servo Control Zoom Lens WV-LZ70/12 on page 2-2.
- Refer to Location of Test points and Adjusting Controls on page 2-25.
- Mount the WV-LZ70/12 to the camera.
- For Flange-back adjustment, refer to 4-2 Adjustment / item NO. (16) Flange-back adjustment on page 2-11.

(1) +2V adjustment

Test point:	**TP8 (+2V)**	**Main board**
Adjust:	**VR5 (+2V ADJ)**	**Main board**

- Connect the digital voltmeter to TP8.
- Adjust VR5 for +2V ± 0.03V.

(2) Zoom balance adjustment

Adjust:	**VR3 (ZOOM BALANCE)**	**Main board**

- Set the lens to fully Wide position by pressing the Servo Zoom Control.
- Measure the time from Wide to Tele position and note the time as (A).
- Set the lens to fully Tele position by pressing the Servo Zoom Control.
- Measure the time from Tele position to Wide position and note the time as (B).
- Adjust VR3 so that (A) = (B).

(3) Zoom speed adjustment

Adjust:	**VR4 (ZOOM SPEED)**	**Main board**

- Adjust VR4 so that zooming speed from tele to wide and wide to tele positions are put between 2.5 µsec and 3.5 µsec.

5. ADJUSTMENT PROCEDURE-2

When individual printed circuit board is replaced, following adjustments shows "○" mark items are required checking or readjusting.

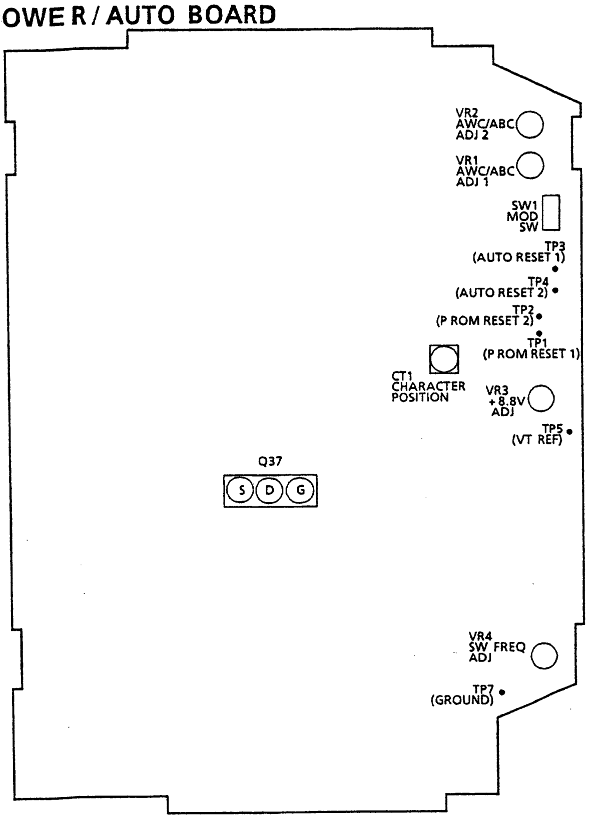
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
POWER / AUTO	○	○																			
SYNC / ENCODER			○	○	○			○	○	○	○		○	○	○						
PREAMP / DRIVE																	○	○	○	○	○
PROCESS / DETAIL																					

	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
POWER / AUTO																			○		○
SYNC / ENCODER																			○	○	
PREAMP / DRIVE						○	○	○	○	○	○	○							○		
PROCESS / DETAIL	○	○	○	○	○	○							○	○	○	○	○	○	○		

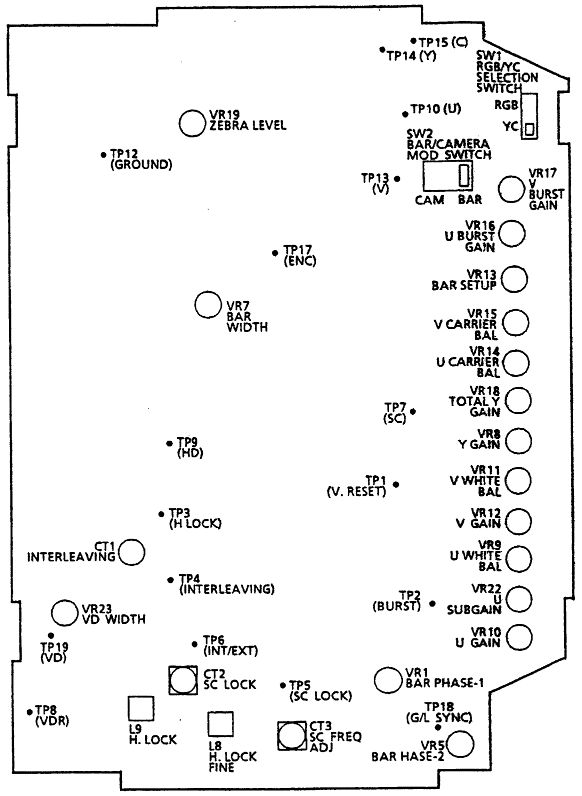
6. LOCATION OF TEST POINTS AND ADJUSTING CONTROLS – Component Side –

< Camera Head >

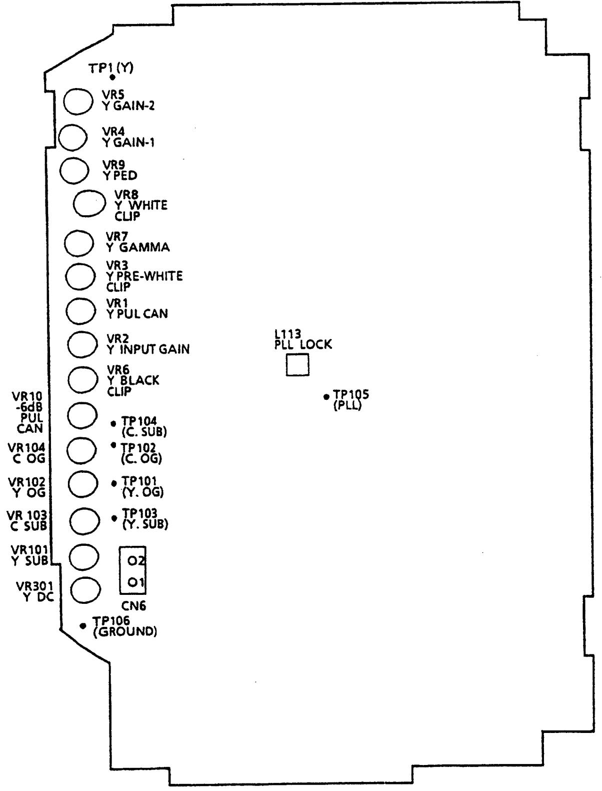
POWER / AUTO BOARD


VR2 AWC/ABC ADJ 2
VR1 AWC/ABC ADJ 1
SW1 MOD SW
TP3 (AUTO RESET 1)
TP4 (AUTO RESET 2)
TP2 (P ROM RESET 2)
TP1 (P ROM RESET 1)
CT1 CHARACTER POSITION
VR3 + 8.8V ADJ
TP5 (VT REF)
Q37
S D G
VR4 SW FREQ ADJ
TP7 (GROUND)

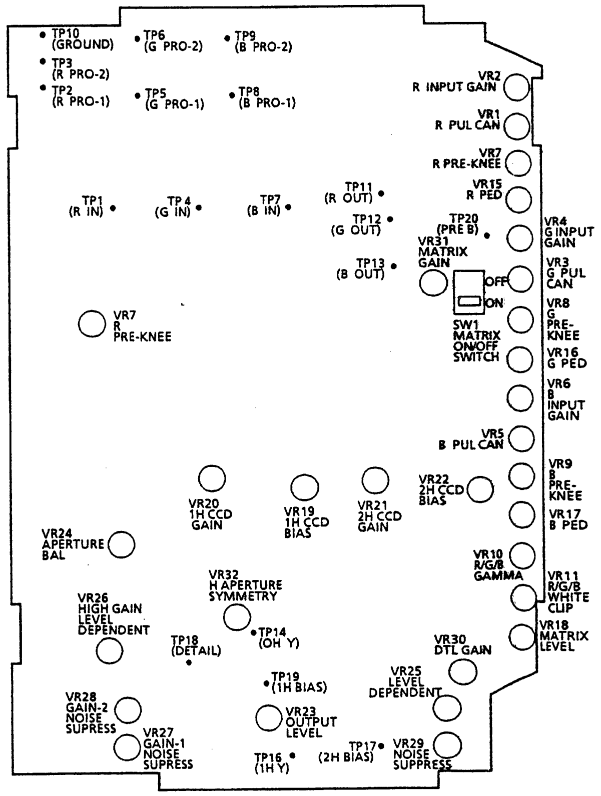
SYNC / ENCODER BOARD


TP15 (C)
TP14 (Y)
SW1 RGB/YC SELECTION SWITCH
RGB
YC
VR19 ZEBRA LEVEL
TP10 (U)
TP12 (GROUND)
SW2 BAR/CAMERA MOD SWITCH
TP13 (V)
CAM BAR
VR17 V BURST GAIN
VR16 U BURST GAIN
TP17 (ENC)
VR13 BAR SETUP
VR7 BAR WIDTH
VR15 V CARRIER BAL
VR14 U CARRIER BAL
VR18 TOTAL Y GAIN
TP7 (SC)
TP9 (HD)
VR8 Y GAIN
TP1 (V. RESET)
VR11 V WHITE BAL
TP3 (H LOCK)
VR12 V GAIN
CT1 INTERLEAVING
VR9 U WHITE BAL
TP4 (INTERLEAVING)
TP2 (BURST)
VR22 U SUBGAIN
VR23 VD WIDTH
TP19 (VD)
TP6 (INT/EXT)
VR10 U GAIN
CT2 SC LOCK
TP5 (SC LOCK)
VR1 BAR PHASE-1
TP8 (VDR)
L9 H. LOCK
L8 H. LOCK FINE
CT3 SC FREQ ADJ
TP18 (G/L SYNC)
VR5 BAR HASE-2

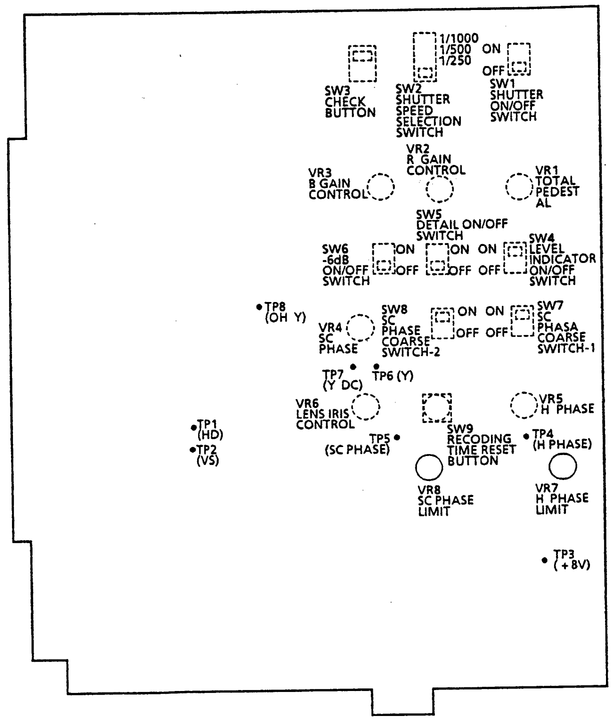
PREAMP / DRIVE BOARD


TP1 (Y)
VR5 Y GAIN-2
VR4 Y GAIN-1
VR9 Y PED
VR8 Y WHITE CLIP
VR7 Y GAMMA
VR3 Y PRE-WHITE CLIP
VR1 Y PUL CAN
VR2 Y INPUT GAIN
L113 PLL LOCK
VR6 Y BLACK CLIP
TP105 (PLL)
VR10 -6dB PUL CAN
TP104 (C. SUB)
VR104 C OG
TP102 (C. OG)
VR102 Y OG
TP101 (Y. OG)
VR 103 C SUB
TP103 (Y. SUB)
VR101 Y SUB
O2
O1
VR301 Y DC
CN6
TP106 (GROUND)

PROCESS / DETAIL BOARD

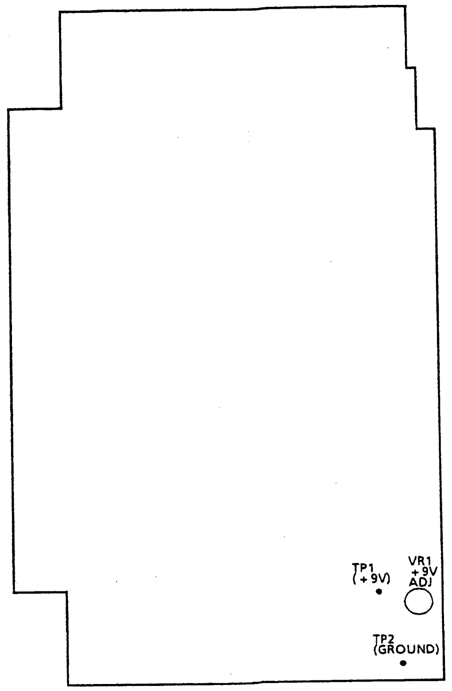

TP10 (GROUND)
TP6 (G PRO-2)
TP9 (B PRO-2)
TP3 (R PRO-2)
TP2 (R PRO-1)
TP5 (G PRO-1)
TP8 (B PRO-1)
VR2 R INPUT GAIN
VR1 R PUL CAN
VR7 R PRE-KNEE
VR15 R PED
TP11 (R OUT)
TP1 (R IN)
TP 4 (G IN)
TP7 (B IN)
TP12 (G OUT)
TP20 (PRE B)
VR31 MATRIX GAIN
VR4 G INPUT GAIN
TP13 (B OUT)
OFF
ON
VR3 G PUL CAN
VR7 R PRE-KNEE
SW1 MATRIX ON/OFF SWITCH
VR8 G PRE-KNEE
VR16 G PED
VR6 B INPUT GAIN
VR5 B PUL CAN
VR9 B PRE-KNEE
VR20 1H CCD GAIN
VR19 1H CCD BIAS
VR21 2H CCD GAIN
VR22 2H CCD BIAS
VR17 B PED
VR24 APERTURE BAL
VR10 R/G/B GAMMA
VR32 H APERTURE SYMMETRY
VR11 R/G/B WHITE CLIP
VR26 HIGH GAIN LEVEL DEPENDENT
TP18 (DETAIL)
TP14 (OH Y)
VR18 MATRIX LEVEL
VR30 DTL GAIN
TP19 (1H BIAS)
VR25 LEVEL DEPENDENT
VR28 GAIN-2 NOISE SUPRESS
VR23 OUTPUT LEVEL
VR27 GAIN-1 NOISE SUPRESS
TP16 (1H Y)
TP17 (2H BIAS)
VR29 NOISE SUPPRESS

MOTHER BOARD


1/1000
1/500
1/250
ON
OFF
SW3 CHECK BUTTON
SW2 SHUTTER SPEED SELECTION SWITCH
SW1 SHUTTER ON/OFF SWITCH
VR2 R GAIN CONTROL
VR3 B GAIN CONTROL
VR1 TOTAL PEDEST AL
SW5 DETAIL ON/OFF SWITCH
SW6 -6dB ON/OFF SWITCH
ON
OFF
SW4 LEVEL INDICATOR ON/OFF SWITCH
TP8 (OH Y)
VR4 SC PHASE
SW8 SC PHASE COARSE SWITCH-2
SW7 SC PHASA COARSE SWITCH-1
TP7 (Y DC)
TP6 (Y)
VR6 LENS IRIS CONTROL
VR5 H PHASE
TP1 (HD)
TP2 (VS)
TP5 (SC PHASE)
SW9 RECODING TIME RESET BUTTON
TP4 (H PHASE)
VR8 SC PHASE LIMIT
VR7 H PHASE LIMIT
TP3 (+8V)

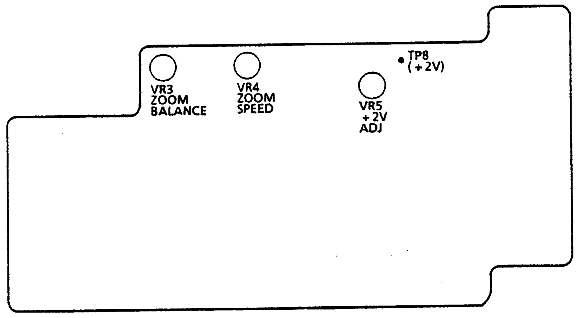
< Camera Adaptor >

MAIN BOARD


TP1 (+9V)
VR1 +9V ADJ
TP2 (GROUND)

< 12X Servo Control Zoom Lens >

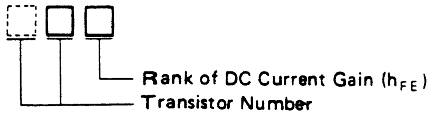
MAIN BOARD


VR3 ZOOM BALANCE
VR4 ZOOM SPEED
TP8 (+2V)
VR5 +2V ADJ

7. CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain (h_{FE})
Transistor Number

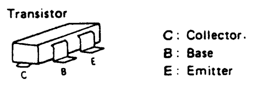
Transistor Number

Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

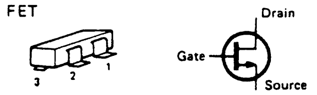
Example

WQ → 2SD602 – Q
YQ → 2SD601 – Q
1BS → 2SB814 – S

Appearance and Symbols


Transistor
C
B
E

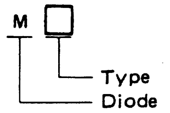
C: Collector.
B: Base
E: Emitter


FET
3
2
1
Drain
Gate
Source

	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

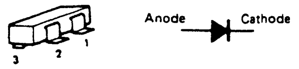
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

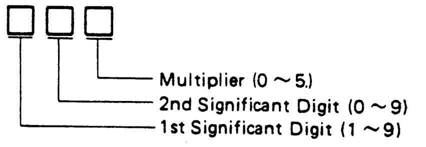
Appearance and Symbols


3
2
1
Anode
Cathode

	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0 ～ 5.)
2nd Significant Digit (0 ～ 9)
1st Significant Digit (1 ～ 9)

EXAMPLE:

330 → $33 \times 10^0 = 33$ ohms
561 → $56 \times 10^1 = 560$ ohms
123 → $12 \times 10^3 = 12$ kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

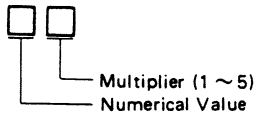
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5	→	0.5 pF	2.5	→	2.5 pF
75	→	0.75 pF	33	→	33 pF
1	→	1 pF	82	→	82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.


Multiplier (1 ～ 5)
Numerical Value

Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

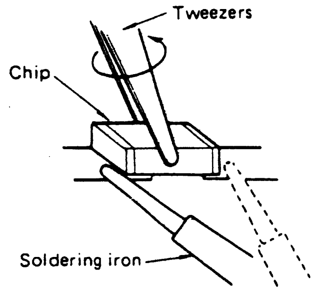
A1 → $10 \times 10^1 = 100$ pF
N2 → $33 \times 10^2 = 3300$ pF
S3 → $47 \times 10^3 = 47000$ pF

5. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

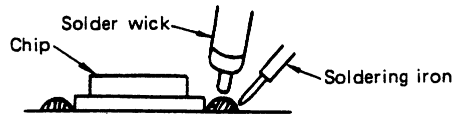
5-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note Be careful not to damage other chips.

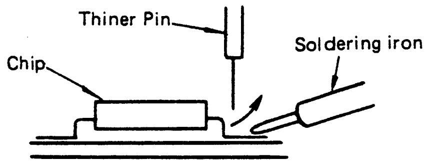

Tweezers
Chip
Soldering iron

5-2 Removal (IC)

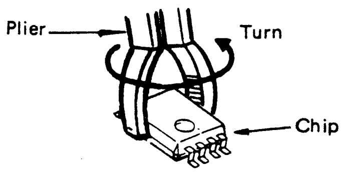
1. Add the solder wick and solder iron to each lead of the IC and remove solder.


Solder wick
Chip
Soldering iron

2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

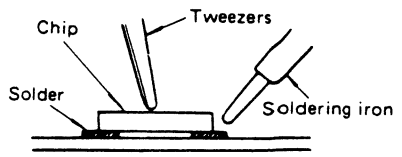

Thiner Pin
Soldering iron
Chip

3. Remove IC turning it with plier.

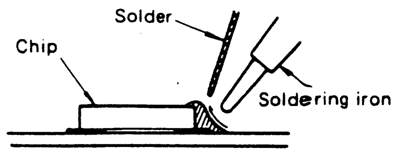

Plier
Turn
Chip

5-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Chip
Tweezers
Solder
Soldering iron

3. Solder both ends of chip (three leads for chip transistor).


Solder
Chip
Soldering iron

Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 3

Block Diagrams
Schematic Diagrams
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Wiring Diagrams

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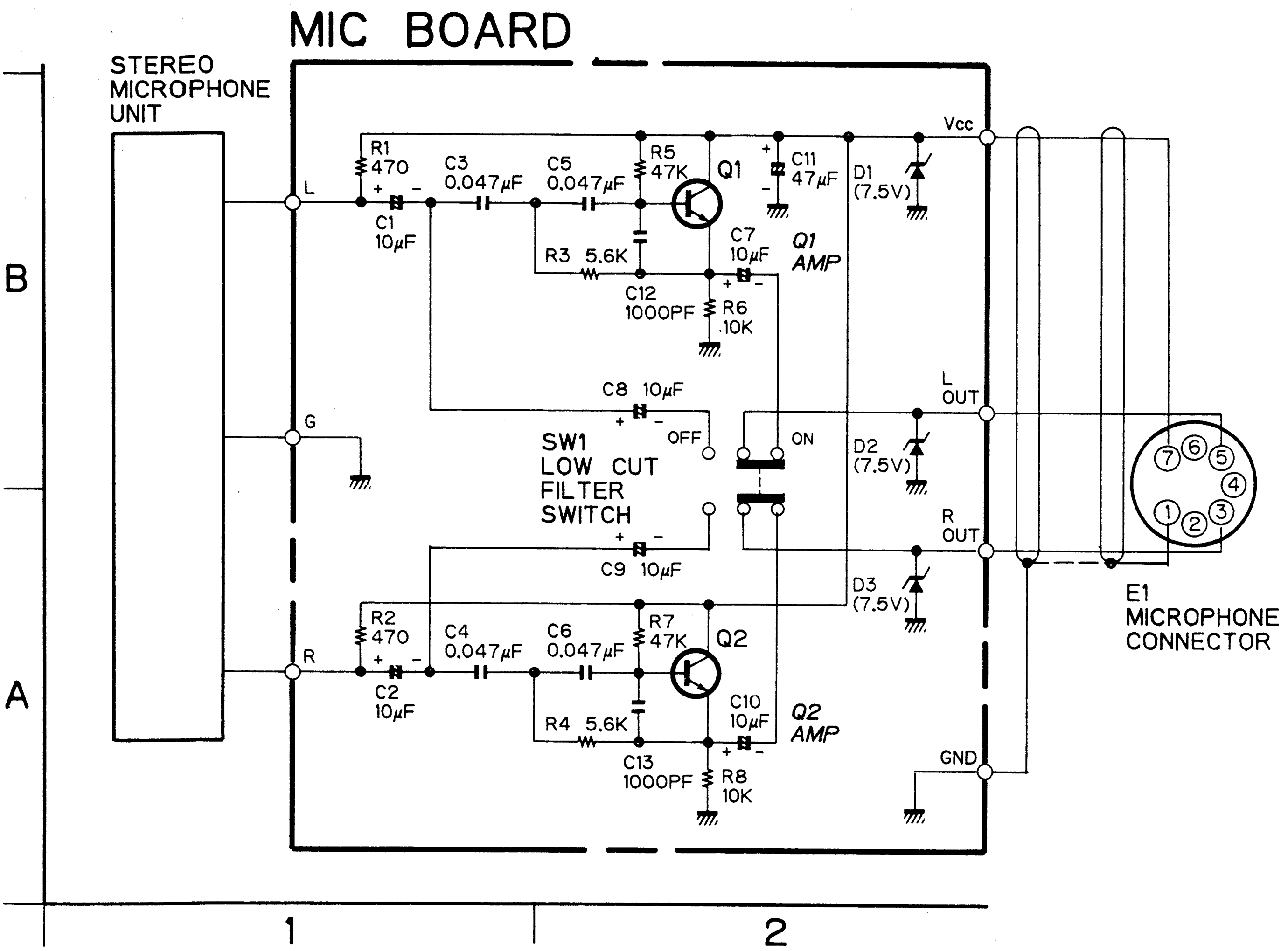
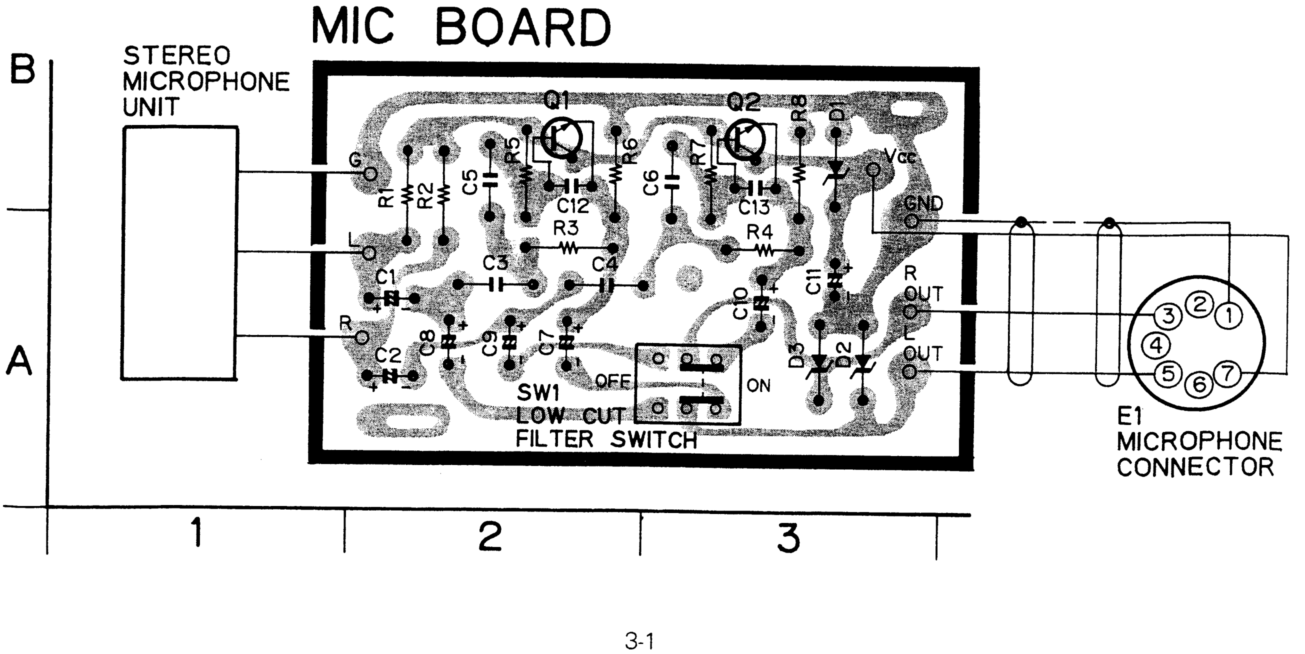
SCHEMATIC DIAGRAM OF STEREO MICROPHONE WV-MC70


MIC BOARD
STEREO MICROPHONE UNIT
L
G
R
R1 470
R2 470
C1 10μF
C2 10μF
C3 0.047μF
C4 0.047μF
C5 0.047μF
C6 0.047μF
R3 5.6K
R4 5.6K
R5 47K
R7 47K
Q1
Q2
C7 10μF
C10 10μF
C11 47μF
C12 1000PF
C13 1000PF
R6 10K
R8 10K
Q1 AMP
Q2 AMP
C8 10μF
C9 10μF
SW1 LOW CUT FILTER SWITCH
OFF
ON
D1 (7.5V)
D2 (7.5V)
D3 (7.5V)
Vcc
L OUT
R OUT
GND
E1 MICROPHONE CONNECTOR
1
2
3
4
5
6
7
A
B
1
2

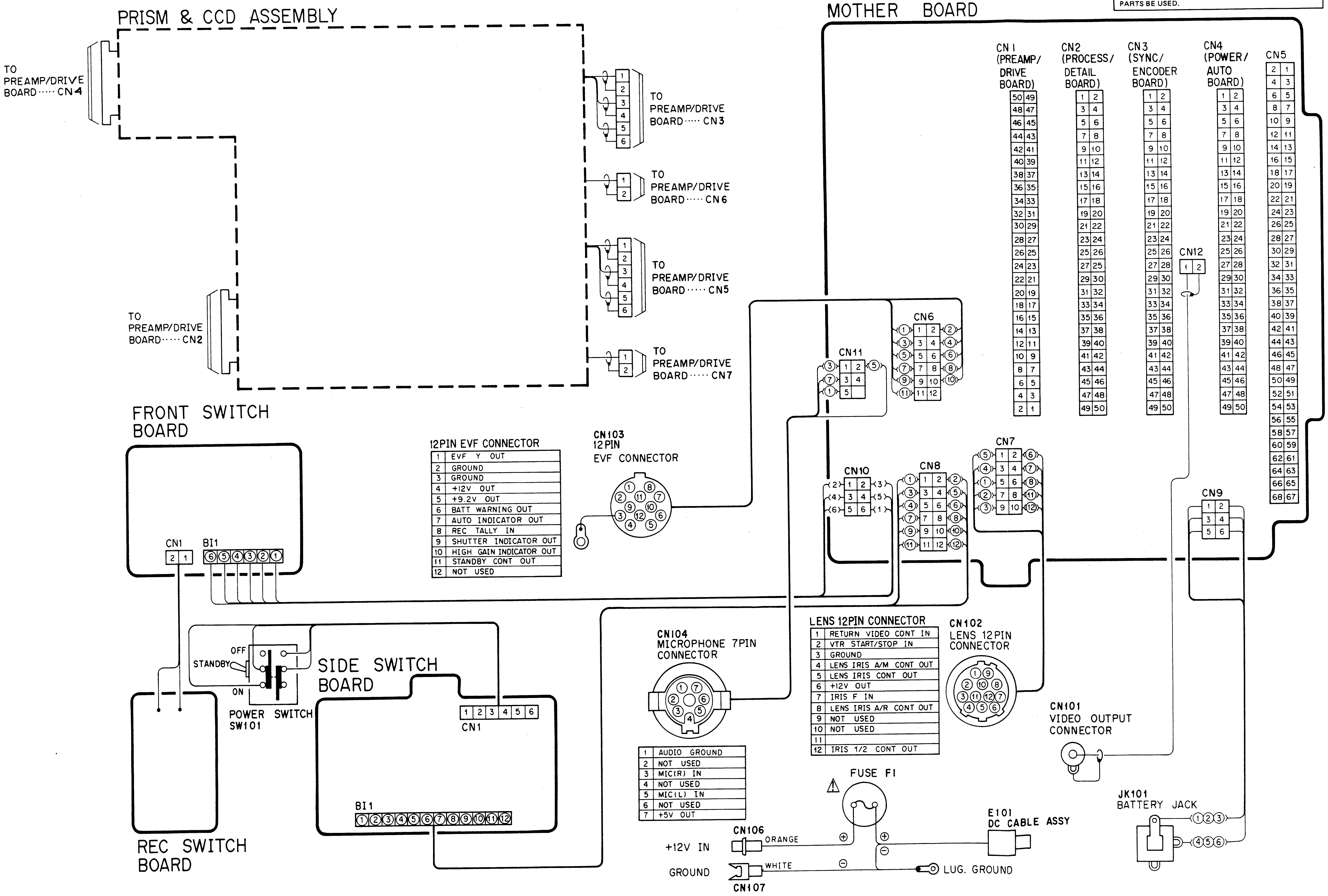
CONDUCTOR VIEW OF STEREO MICROPHONE WV-MC70


MIC BOARD
STEREO MICROPHONE UNIT
G
L
R
Q1
Q2
R1
R2
R5
R6
R7
R8
C5
C6
C12
C13
R3
R4
D1
Vcc
GND
C1
C2
C3
C4
C7
C8
C9
C10
C11
D2
D3
R OUT
L OUT
SW1 LOW CUT FILTER SWITCH
OFF
ON
E1 MICROPHONE CONNECTOR
1
2
3
4
5
6
7
A
B
1
2
3

WIRING DIAGRAM

PRODUCT SAFETY NOTICE

COMPONENT IDENTIFIED WITH THE "⚠" MARK HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN SERVICING ANY OF THESE COMPONENTS, IT IS ESSENTIAL THAT ONLY MANUFACTURE'S SPECIFIED PARTS BE USED.


PRISM & CCD ASSEMBLY
TO PREAMP/DRIVE BOARD ····· CN4
TO PREAMP/DRIVE BOARD ····· CN3
TO PREAMP/DRIVE BOARD ····· CN6
TO PREAMP/DRIVE BOARD ····· CN5
TO PREAMP/DRIVE BOARD ····· CN2
TO PREAMP/DRIVE BOARD ····· CN7
MOTHER BOARD
CN1 (PREAMP/ DRIVE BOARD)
CN2 (PROCESS/ DETAIL BOARD)
CN3 (SYNC/ ENCODER BOARD)
CN4 (POWER/ AUTO BOARD)
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
FRONT SWITCH BOARD
CN1
BI1
CN103 12PIN EVF CONNECTOR
SIDE SWITCH BOARD
CN1
BI1
OFF
STANDBY
ON
POWER SWITCH SW101
REC SWITCH BOARD
CN104 MICROPHONE 7PIN CONNECTOR
CN102 LENS 12PIN CONNECTOR
CN101 VIDEO OUTPUT CONNECTOR
FUSE F1
⚠
CN106
ORANGE
+12V IN
GROUND
WHITE
CN107
⊕
⊖
E101 DC CABLE ASSY
LUG. GROUND
JK101 BATTERY JACK
①②③
④⑤⑥

12PIN EVF CONNECTOR

1	EVF Y OUT
2	GROUND
3	GROUND
4	+12V OUT
5	+9.2V OUT
6	BATT WARNING OUT
7	AUTO INDICATOR OUT
8	REC TALLY IN
9	SHUTTER INDICATOR OUT
10	HIGH GAIN INDICATOR OUT
11	STANDBY CONT OUT
12	NOT USED

CN104 MICROPHONE 7PIN CONNECTOR

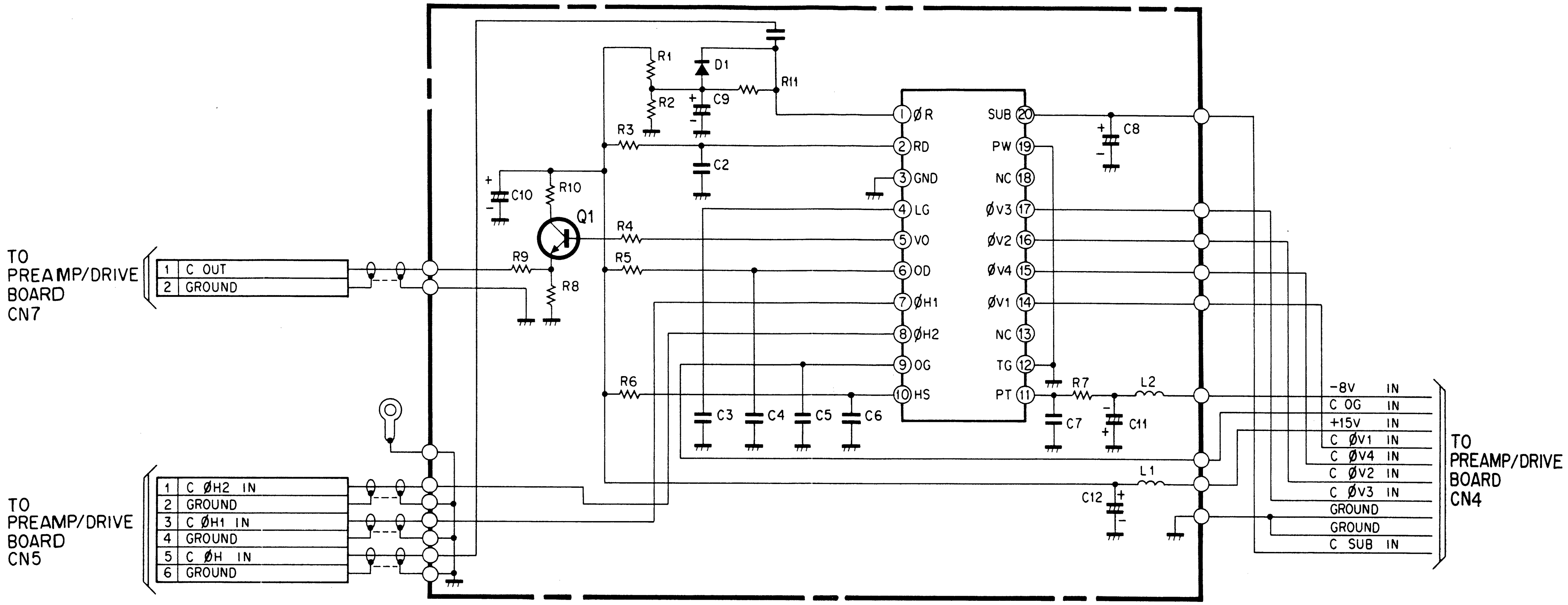
1	AUDIO GROUND
2	NOT USED
3	MIC(R) IN
4	NOT USED
5	MIC(L) IN
6	NOT USED
7	+5V OUT

LENS 12PIN CONNECTOR

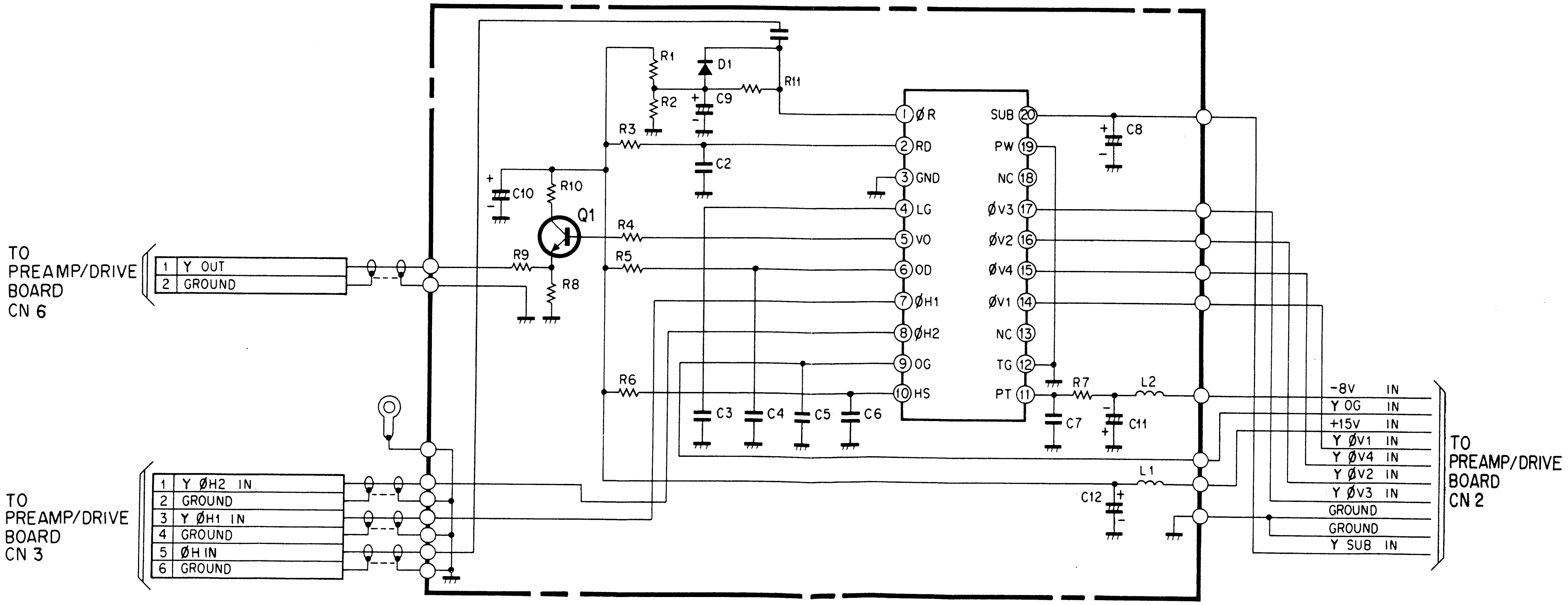
1	RETURN VIDEO CONT IN
2	VTR START/STOP IN
3	GROUND
4	LENS IRIS A/M CONT OUT
5	LENS IRIS CONT OUT
6	+12V OUT
7	IRIS F IN
8	LENS IRIS A/R CONT OUT
9	NOT USED
10	NOT USED
11	
12	IRIS 1/2 CONT OUT

SCHEMATIC DIAGRAM OF CCD & PRISM ASSEMBLY

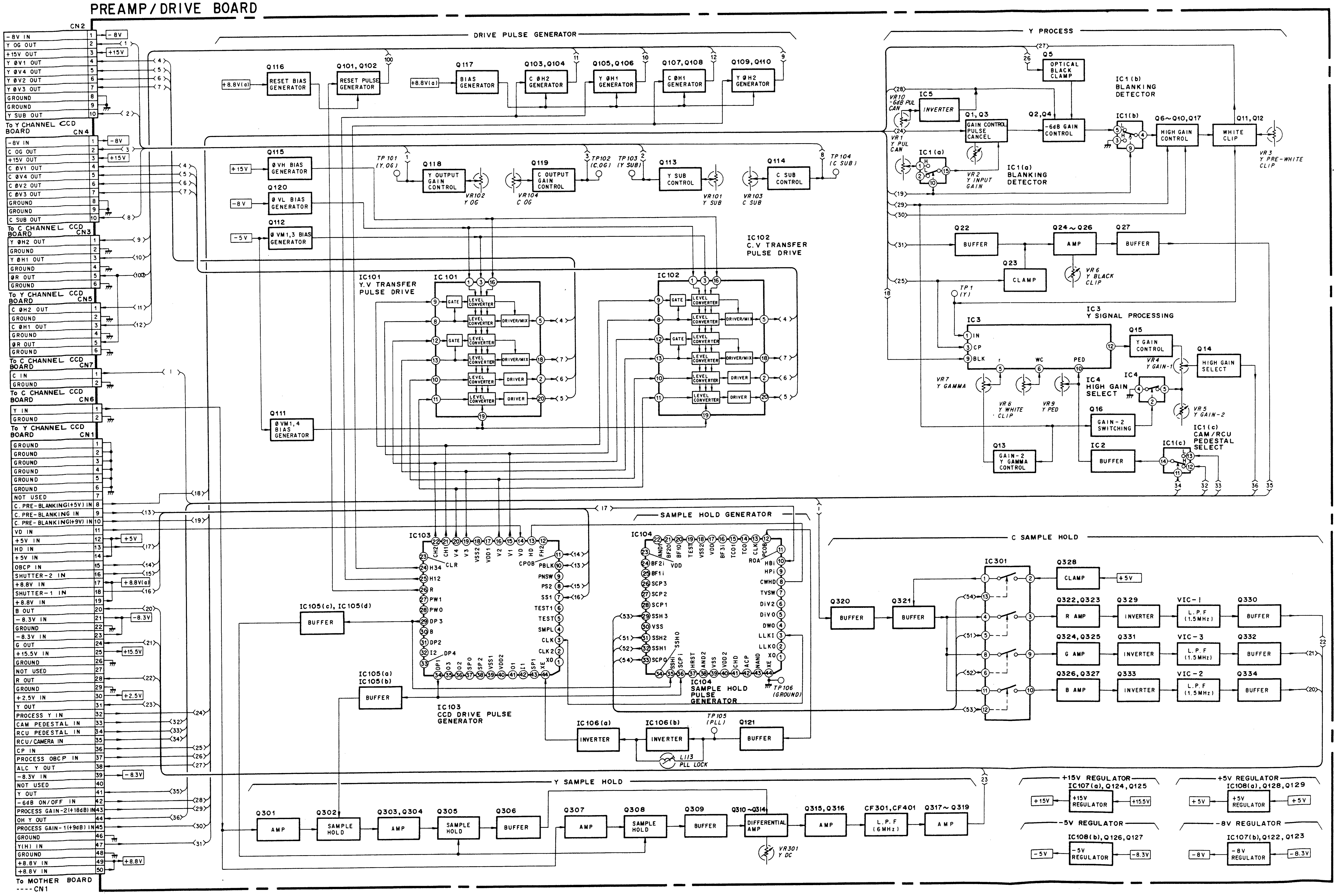
C CHANNEL CCD BOARD


TO PREAMP/DRIVE BOARD CN7
1 C OUT
2 GROUND
TO PREAMP/DRIVE BOARD CN5
1 C ØH2 IN
2 GROUND
3 C ØH1 IN
4 GROUND
5 C ØH IN
6 GROUND
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
D1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
Q1
L1
L2
1 ØR
2 RD
3 GND
4 LG
5 VO
6 OD
7 ØH1
8 ØH2
9 OG
10 HS
SUB 20
PW 19
NC 18
ØV3 17
ØV2 16
ØV4 15
ØV1 14
NC 13
TG 12
PT 11
-8V IN
C OG IN
+15V IN
C ØV1 IN
C ØV4 IN
C ØV2 IN
C ØV3 IN
GROUND
GROUND
C SUB IN
TO PREAMP/DRIVE BOARD CN4

Y CHANNEL CCD BOARD

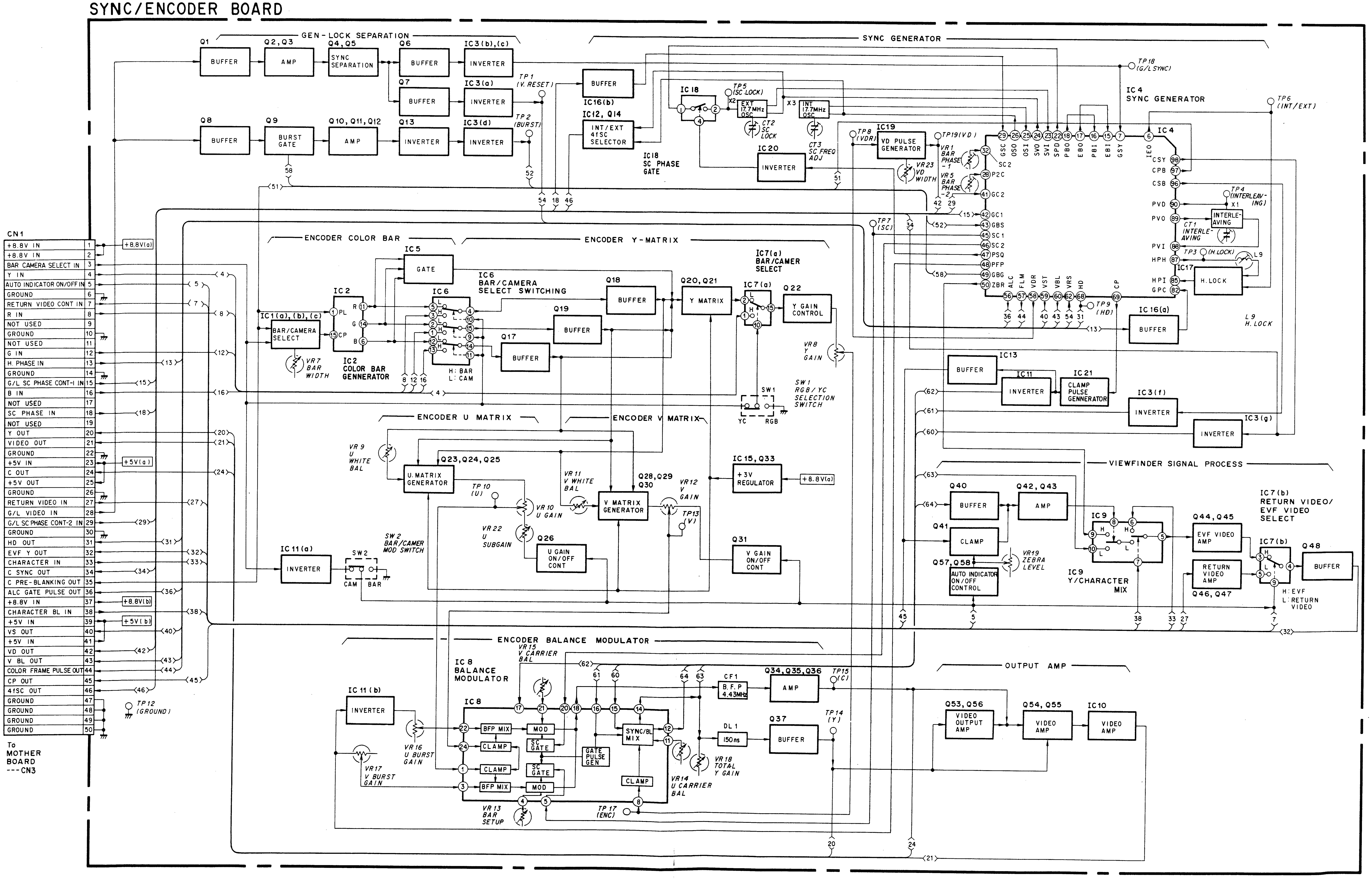

TO PREAMP/DRIVE BOARD CN 6
1 Y OUT
2 GROUND
TO PREAMP/DRIVE BOARD CN 3
1 Y ØH2 IN
2 GROUND
3 Y ØH1 IN
4 GROUND
5 ØH IN
6 GROUND
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
D1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
Q1
L1
L2
1 ØR
2 RD
3 GND
4 LG
5 VO
6 OD
7 ØH1
8 ØH2
9 OG
10 HS
SUB 20
PW 19
NC 18
ØV3 17
ØV2 16
ØV4 15
ØV1 14
NC 13
TG 12
PT 11
-8V IN
Y OG IN
+15V IN
Y ØV1 IN
Y ØV4 IN
Y ØV2 IN
Y ØV3 IN
GROUND
GROUND
Y SUB IN
TO PREAMP/DRIVE BOARD CN 2

BLOCK DIAGRAM OF PREAMP/DRIVE BOARD

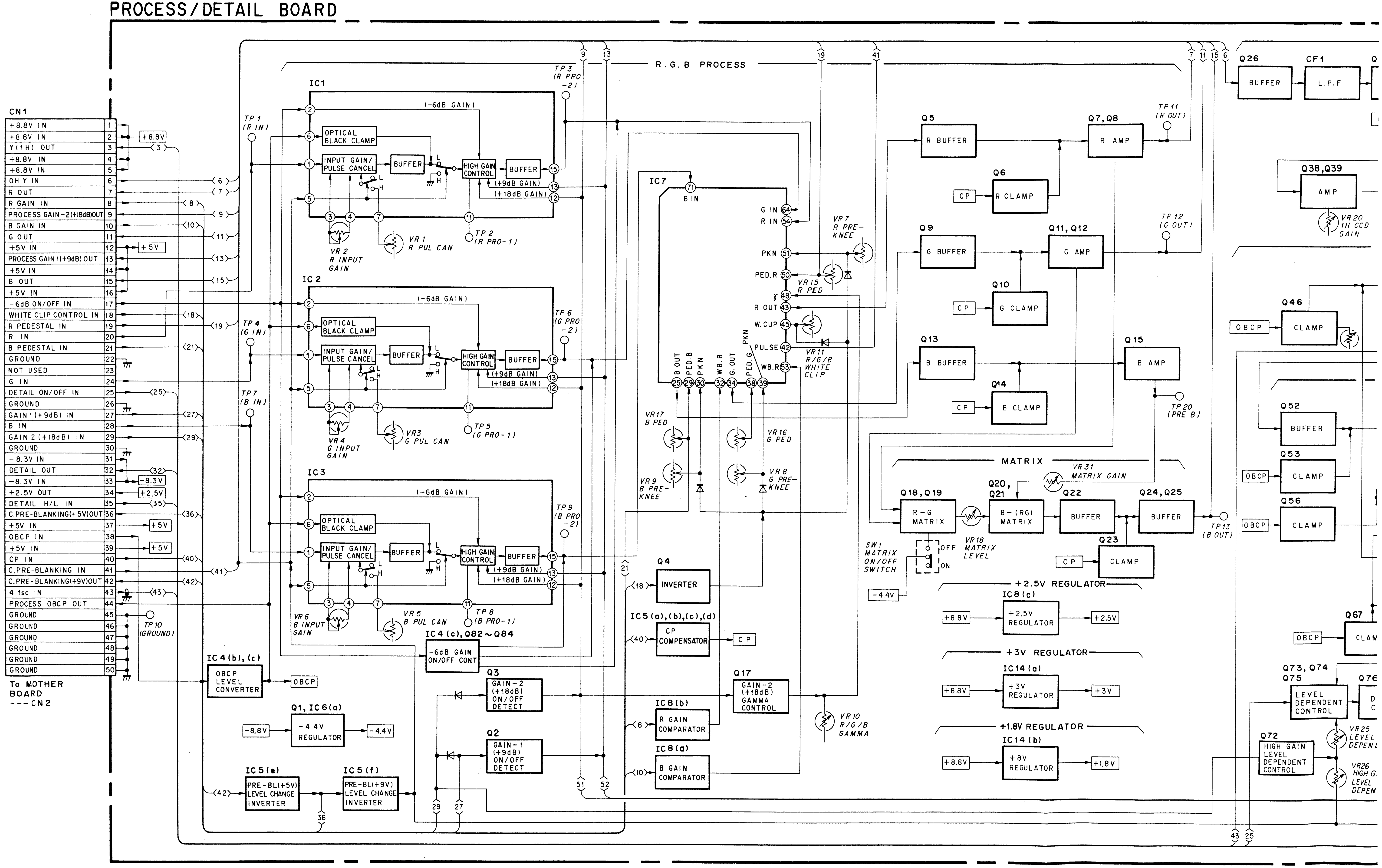


PREAMP/DRIVE BOARD
CN2
-8V IN
Y OG OUT
+15V OUT
Y ØV1 OUT
Y ØV4 OUT
Y ØV2 OUT
Y ØV3 OUT
GROUND
GROUND
Y SUB OUT
To Y CHANNEL CCD BOARD CN4
-8V IN
C OG OUT
+15V OUT
C ØV1 OUT
C ØV4 OUT
C ØV2 OUT
C ØV3 OUT
GROUND
GROUND
C SUB OUT
To C CHANNEL CCD BOARD CN3
Y ØH2 OUT
GROUND
Y ØH1 OUT
GROUND
ØR OUT
GROUND
To Y CHANNEL CCD BOARD CN5
C ØH2 OUT
GROUND
C ØH1 OUT
GROUND
ØR OUT
GROUND
To C CHANNEL CCD BOARD CN7
C IN
GROUND
To C CHANNEL CCD BOARD CN6
Y IN
GROUND
To Y CHANNEL CCD BOARD CN1
GROUND
GROUND
GROUND
GROUND
GROUND
GROUND
NOT USED
C. PRE-BLANKING(+5V) IN
C. PRE-BLANKING IN
C. PRE-BLANKING(+9V) IN
VD IN
+5V IN
HD IN
+5V IN
OBCP IN
SHUTTER-2 IN
+8.8V IN
SHUTTER-1 IN
+8.8V IN
B OUT
-8.3V IN
GROUND
-8.3V IN
G OUT
+15.5V IN
GROUND
NOT USED
R OUT
GROUND
+2.5V IN
Y OUT
PROCESS Y IN
CAM PEDESTAL IN
RCU PEDESTAL IN
RCU/CAMERA IN
CP IN
PROCESS OBCP IN
ALC Y OUT
-8.3V IN
NOT USED
Y OUT
-6dB ON/OFF IN
PROCESS GAIN-2(+18dB) IN
OH Y OUT
PROCESS GAIN-1(+9dB) IN
GROUND
Y(H) IN
GROUND
+8.8V IN
+8.8V IN
To MOTHER BOARD ----CN1
-8V
+15V
+8.8V(a)
+15V
-8V
-5V
+5V
-8.3V
+15.5V
+2.5V
-8.3V
+8.8V
DRIVE PULSE GENERATOR
Q116 RESET BIAS GENERATOR
Q101, Q102 RESET PULSE GENERATOR
Q117 BIAS GENERATOR
Q103, Q104 C ØH2 GENERATOR
Q105, Q106 Y ØH1 GENERATOR
Q107, Q108 C ØH1 GENERATOR
Q109, Q110 Y ØH2 GENERATOR
Q115 Ø VH BIAS GENERATOR
Q120 Ø VL BIAS GENERATOR
Q112 Ø VM1,3 BIAS GENERATOR
Q118 Y OUTPUT GAIN CONTROL
VR102 Y OG
TP101 (Y.OG)
Q119 C OUTPUT GAIN CONTROL
VR104 C OG
TP102 (C.OG)
TP103 (Y SUB)
Q113 Y SUB CONTROL
VR101 Y SUB
VR103 C SUB
Q114 C SUB CONTROL
TP104 (C SUB)
IC101 Y.V TRANSFER PULSE DRIVE
IC102 C.V TRANSFER PULSE DRIVE
GATE
LEVEL CONVERTER
DRIVER/MIX
DRIVER
Q111 Ø VM1,4 BIAS GENERATOR
IC103 CCD DRIVE PULSE GENERATOR
CH2 CH1 V4 V3 VSS2 VDD1 V2 V1 VD HD FH2
H34 H12 R PW1 PWO DP3 B DP2 I2 DP4
CLR CPOB PBLK PNSW PS2 SS1 TEST1 TEST SMPL CLK CLK2 XO
DP1 O3 O2 SPO SP2 VSS1 VDD2 O1 I1 SP1 XE
IC105(c), IC105(d) BUFFER
IC105(a) IC105(b) BUFFER
SAMPLE HOLD GENERATOR
IC104 SAMPLE HOLD PULSE GENERATOR
BF2i BF2O BF1O TEST VDD VSS2 BF3i TCO TCOi CLK PCOB
BF1i VDD ROA HBi HPi CWHD TVSW DIV2 DIVO DWO LLKI LLKO XO
SCP3 SCP2 SCP1 SSH3 VSS SSH2 SSH1 SCPO
SSHO SSHi SCPi HRST AND2 VSS VDD2 CHD ACP NAND XE
TP106 (GROUND)
TP105 (PLL)
IC106(a) INVERTER
IC106(b) INVERTER
Q121 BUFFER
L113 PLL LOCK
Y PROCESS
Q5 OPTICAL BLACK CLAMP
IC1(b) BLANKING DETECTOR
IC5 INVERTER
VR10 -6dB PUL CAN
VR1 Y PUL CAN
Q1, Q3 GAIN CONTROL PULSE CANCEL
Q2, Q4 -6dB GAIN CONTROL
IC1(b)
Q6~Q10, Q17 HIGH GAIN CONTROL
Q11, Q12 WHITE CLIP
VR3 Y PRE-WHITE CLIP
IC1(a)
VR2 Y INPUT GAIN
IC1(a) BLANKING DETECTOR
Q22 BUFFER
Q24~Q26 AMP
Q27 BUFFER
Q23 CLAMP
VR6 Y BLACK CLIP
TP1 (Y)
IC3 Y SIGNAL PROCESSING
IC3
IN CP BLK γ WC PED
Q15 Y GAIN CONTROL
VR4 Y GAIN-1
Q14 HIGH GAIN SELECT
VR7 Y GAMMA
VR8 Y WHITE CLIP
VR9 Y PED
IC4 HIGH GAIN SELECT
VR5 Y GAIN-2
Q16 GAIN-2 SWITCHING
Q13 GAIN-2 Y GAMMA CONTROL
IC2 BUFFER
IC1(c)
IC1(c) CAM/RCU PEDESTAL SELECT
C SAMPLE HOLD
IC301
Q328 CLAMP
Q320 BUFFER
Q321 BUFFER
Q322, Q323 R AMP
Q329 INVERTER
VIC-1 L.P.F (1.5MHz)
Q330 BUFFER
Q324, Q325 G AMP
Q331 INVERTER
VIC-3 L.P.F (1.5MHz)
Q332 BUFFER
Q326, Q327 B AMP
Q333 INVERTER
VIC-2 L.P.F (1.5MHz)
Q334 BUFFER
Y SAMPLE HOLD
Q301 AMP
Q302 SAMPLE HOLD
Q303, Q304 AMP
Q305 SAMPLE HOLD
Q306 BUFFER
Q307 AMP
Q308 SAMPLE HOLD
Q309 BUFFER
Q310~Q314 DIFFERENTIAL AMP
VR301 Y DC
Q315, Q316 AMP
CF301, CF401 L.P.F (6MHz)
Q317~Q319 AMP
+15V REGULATOR IC107(a), Q124, Q125
+15V REGULATOR
+15.5V
+5V REGULATOR IC108(a), Q128, Q129
+5V REGULATOR
-5V REGULATOR IC108(b), Q126, Q127
-5V REGULATOR
-8V REGULATOR IC107(b), Q122, Q123
-8V REGULATOR
-8.3V

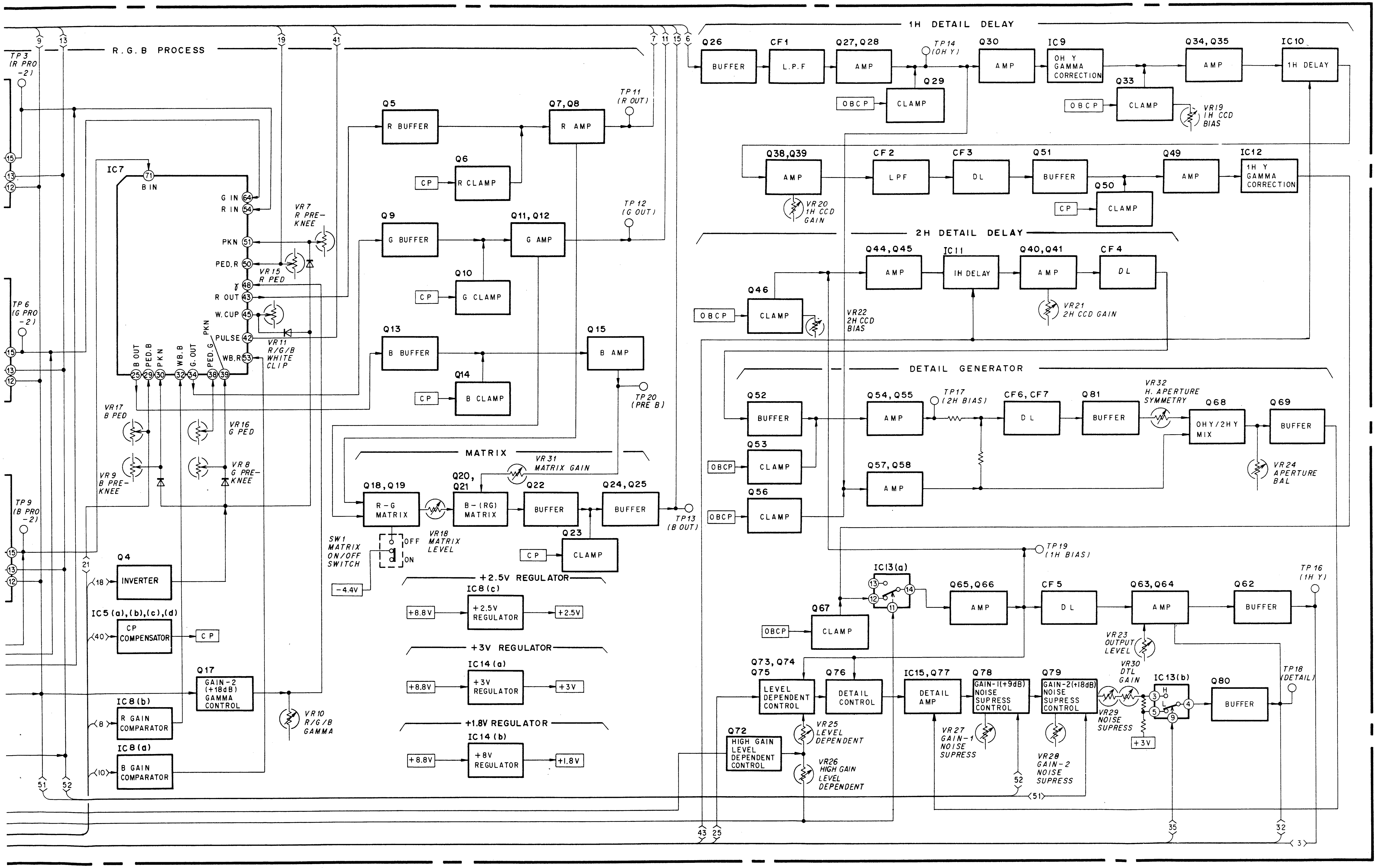
BLOCK DIAGRAM OF SYNC/ENCODER BOARD


SYNC/ENCODER BOARD
GEN-LOCK SEPARATION
Q1
BUFFER
Q2,Q3
AMP
Q4,Q5
SYNC SEPARATION
Q6
BUFFER
IC3(b),(c)
INVERTER
Q7
BUFFER
IC3(a)
INVERTER
Q8
BUFFER
Q9
BURST GATE
Q10,Q11,Q12
AMP
Q13
INVERTER
IC3(d)
INVERTER
TP1 (V. RESET)
TP2 (BURST)
BUFFER
IC16(b)
IC12, Q14
INT/EXT 4fSC SELECTOR
SYNC GENERATOR
IC18
TP5 (SC LOCK)
EXT 17.7MHz OSC
X2
X3
INT 17.7MHz OSC
CT2 SC LOCK
CT3 SC FREQ ADJ
IC18 SC PHASE GATE
IC20
INVERTER
TP8 (VDR)
IC19
VD PULSE GENERATOR
TP19 (VD)
VR1 BAR PHASE -1
VR23 VD WIDTH
VR5 BAR PHASE -2
TP18 (G/L SYNC)
IC4 SYNC GENERATOR
TP6 (INT/EXT)
IC4
GSC OSO OSI SVO SVI SPD PBO EBO PBI EBI GSY IEO
SC2
P2C
GC2
GC1
GBS
SC1
SC2
PSQ
PFP
GBG
ZBR
ALC FLM VDR VST VBL VRS HD CP
CSY
CPB
CSB
PVD
PVO
PVI
HPH
HPI
GPC
TP4 (INTERLEAVING)
X1
INTERLEAVING
CT1 INTERLEAVING
TP3 (H.LOCK)
L9
IC17
H.LOCK
TP7 (SC)
TP9 (HD)
IC16(a)
BUFFER
L9 H.LOCK
CN1
+8.8V IN
+8.8V IN
BAR CAMERA SELECT IN
Y IN
AUTO INDICATOR ON/OFF IN
GROUND
RETURN VIDEO CONT IN
R IN
NOT USED
GROUND
NOT USED
G IN
H. PHASE IN
GROUND
G/L SC PHASE CONT-1 IN
B IN
NOT USED
SC PHASE IN
NOT USED
Y OUT
VIDEO OUT
GROUND
+5V IN
C OUT
+5V OUT
GROUND
RETURN VIDEO IN
G/L VIDEO IN
G/L SC PHASE CONT-2 IN
GROUND
HD OUT
EVF Y OUT
CHARACTER IN
C SYNC OUT
C PRE-BLANKING OUT
ALC GATE PULSE OUT
+8.8V IN
CHARACTER BL IN
+5V IN
VS OUT
+5V IN
VD OUT
V BL OUT
COLOR FRAME PULSE OUT
CP OUT
4fSC OUT
GROUND
GROUND
GROUND
GROUND
+8.8V(a)
+5V(a)
+8.8V(b)
+5V(b)
TP12 (GROUND)
To MOTHER BOARD ---CN3
ENCODER COLOR BAR
ENCODER Y-MATRIX
IC5
GATE
IC2
IC1(a),(b),(c)
BAR/CAMERA SELECT
VR7 BAR WIDTH
IC2 COLOR BAR GENNERATOR
IC6
H: BAR L: CAM
IC6 BAR/CAMERA SELECT SWITCHING
Q18
BUFFER
Q19
BUFFER
Q17
BUFFER
Q20,Q21
Y MATRIX
IC7(a) BAR/CAMER SELECT
IC7(a)
Q22
Y GAIN CONTROL
VR8 Y GAIN
SW1
SW1 RGB/YC SELECTION SWITCH
YC RGB
ENCODER U MATRIX
ENCODER V MATRIX
VR9 U WHITE BAL
Q23,Q24,Q25
U. MATRIX GENERATOR
TP10 (U)
VR10 U GAIN
VR22 U SUBGAIN
Q26
U GAIN ON/OFF CONT
VR11 V WHITE BAL
Q28,Q29 Q30
V MATRIX GENERATOR
VR12 V GAIN
TP13 (V)
IC15,Q33
+3V REGULATOR
+8.8V(a)
Q31
V GAIN ON/OFF CONT
IC11(a)
INVERTER
SW2
SW2 BAR/CAMER MOD SWITCH
CAM BAR
IC13
BUFFER
IC11
INVERTER
IC21
CLAMP PULSE GENNERATOR
IC3(f)
INVERTER
IC3(g)
INVERTER
VIEWFINDER SIGNAL PROCESS
Q40
BUFFER
Q42,Q43
AMP
Q41
CLAMP
VR19 ZEBRA LEVEL
Q57,Q58
AUTO INDICATOR ON/OFF CONTROL
IC9
IC9 Y/CHARACTER MIX
Q44,Q45
EVF VIDEO AMP
RETURN VIDEO AMP
Q46,Q47
IC7(b) RETURN VIDEO/ EVF VIDEO SELECT
IC7(b)
Q48
BUFFER
H: EVF L: RETURN VIDEO
ENCODER BALANCE MODULATOR
VR15 V CARRIER BAL
IC8 BALANCE MODULATOR
IC8
IC11(b)
INVERTER
VR16 U BURST GAIN
VR17 V BURST GAIN
BFP MIX
CLAMP
CLAMP
BFP MIX
MOD
SC GATE
SC GATE
MOD
GATE PULSE GEN
SYNC/BL MIX
CLAMP
VR13 BAR SETUP
VR14 U CARRIER BAL
TP17 (ENC)
CF1
B.P.F 4.43MHz
Q34,Q35,Q36
AMP
TP15 (C)
DL1
150ns
Q37
BUFFER
TP14 (Y)
VR18 TOTAL Y GAIN
OUTPUT AMP
Q53,Q56
VIDEO OUTPUT AMP
Q54,Q55
VIDEO AMP
IC10
VIDEO AMP

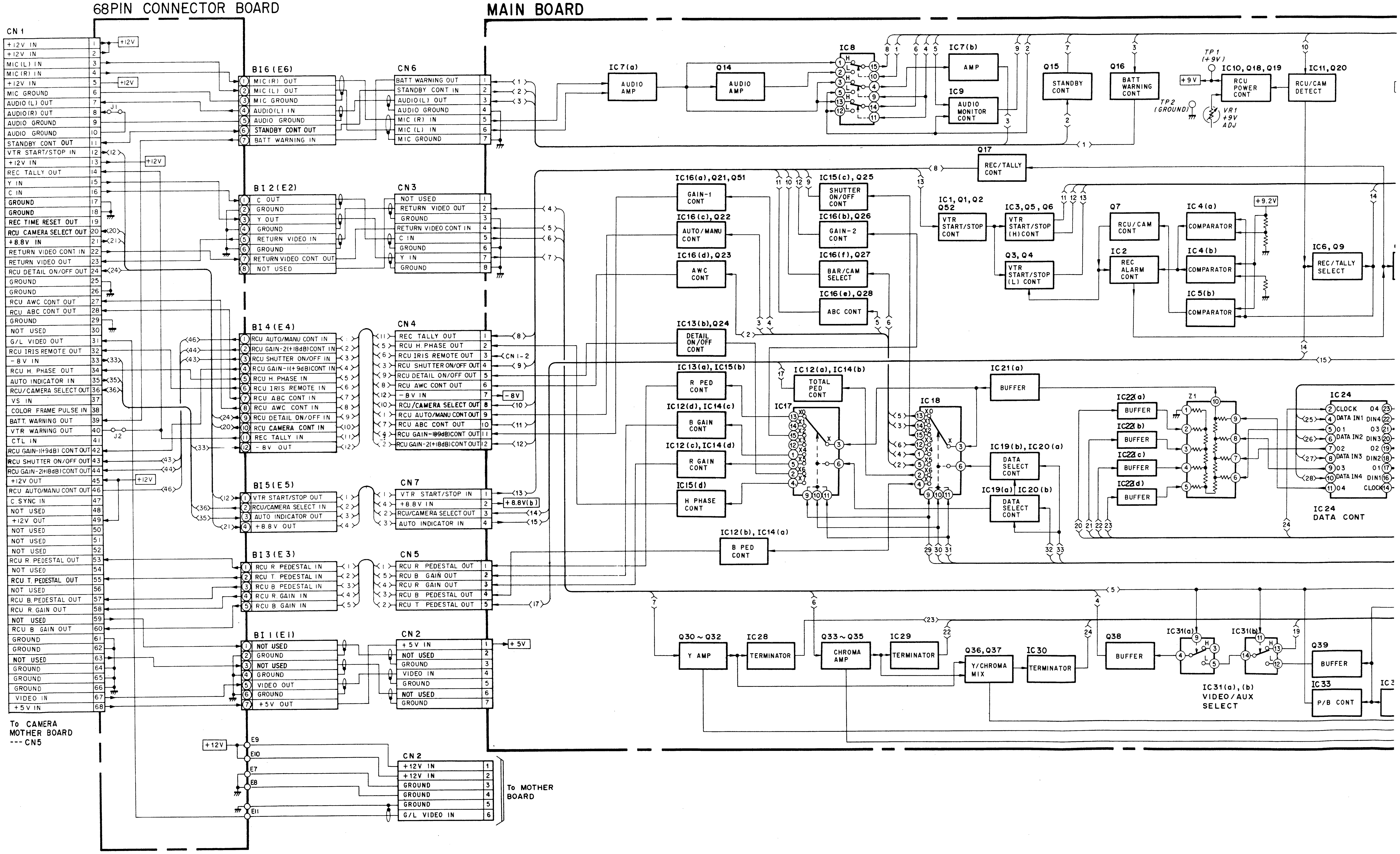
BLOCK DIAGRAM OF PROCESS/DETAIL BOARD


PROCESS/DETAIL BOARD
CN1
+8.8V IN 1
+8.8V IN 2
Y(1H) OUT 3
+8.8V IN 4
+8.8V IN 5
OH Y IN 6
R OUT 7
R GAIN IN 8
PROCESS GAIN-2(+18dB)OUT 9
B GAIN IN 10
G OUT 11
+5V IN 12
PROCESS GAIN 1(+9dB) OUT 13
+5V IN 14
B OUT 15
+5V IN 16
-6dB ON/OFF IN 17
WHITE CLIP CONTROL IN 18
R PEDESTAL IN 19
R IN 20
B PEDESTAL IN 21
GROUND 22
NOT USED 23
G IN 24
DETAIL ON/OFF IN 25
GROUND 26
GAIN 1 (+9dB) IN 27
B IN 28
GAIN 2 (+18dB) IN 29
GROUND 30
-8.3V IN 31
DETAIL OUT 32
-8.3V IN 33
+2.5V OUT 34
DETAIL H/L IN 35
C.PRE-BLANKING(+5V)OUT 36
+5V IN 37
OBCP IN 38
+5V IN 39
CP IN 40
C.PRE-BLANKING IN 41
C.PRE-BLANKING(+9V)OUT 42
4 fsc IN 43
PROCESS OBCP OUT 44
GROUND 45
GROUND 46
GROUND 47
GROUND 48
GROUND 49
GROUND 50
To MOTHER BOARD ---CN2
+8.8V
+5V
-8.3V
+2.5V
+5V
+5V
TP 10 (GROUND)
R.G.B PROCESS
IC1
IC2
IC3
TP 1 (R IN)
TP 4 (G IN)
TP7 (B IN)
TP 3 (R PRO -2)
TP 6 (G PRO -2)
TP 9 (B PRO -2)
TP 2 (R PRO-1)
TP 5 (G PRO-1)
TP 8 (B PRO-1)
(-6dB GAIN)
OPTICAL BLACK CLAMP
INPUT GAIN/ PULSE CANCEL
BUFFER
HIGH GAIN CONTROL
(+9dB GAIN)
(+18dB GAIN)
L
H
VR 1 R PUL CAN
VR 2 R INPUT GAIN
VR3 G PUL CAN
VR 4 G INPUT GAIN
VR 5 B PUL CAN
VR 6 B INPUT GAIN
IC 4 (c), Q82~Q84
-6dB GAIN ON/OFF CONT
IC 4 (b), (c)
OBCP LEVEL CONVERTER
OBCP
Q1, IC6(a)
-8.8V
-4.4V REGULATOR
-4.4V
IC 5 (e)
PRE-BL(+5V) LEVEL CHANGE INVERTER
IC 5 (f)
PRE-BL(+9V) LEVEL CHANGE INVERTER
Q3
GAIN-2 (+18dB) ON/OFF DETECT
Q2
GAIN-1 (+9dB) ON/OFF DETECT
IC7
B IN
G IN
R IN
PKN
PED.R
γ
R OUT
W.CUP
PULSE
WB.R
B OUT
PED.B
PKN
WB.B
G.OUT
PED.G
PKN
VR 7 R PRE-KNEE
VR 15 R PED
VR 11 R/G/B WHITE CLIP
VR 17 B PED
VR 9 B PRE-KNEE
VR 16 G PED
VR 8 G PRE-KNEE
Q4
INVERTER
IC5 (a),(b),(c),(d)
CP COMPENSATOR
CP
IC8 (b)
R GAIN COMPARATOR
IC8 (a)
B GAIN COMPARATOR
Q17
GAIN-2 (+18dB) GAMMA CONTROL
VR 10 R/G/B GAMMA
Q5
R BUFFER
Q6
CP
R CLAMP
Q7, Q8
R AMP
TP 11 (R OUT)
Q9
G BUFFER
Q10
G CLAMP
Q11, Q12
G AMP
TP 12 (G OUT)
Q13
B BUFFER
Q14
B CLAMP
Q15
B AMP
TP 20 (PRE B)
MATRIX
VR 31 MATRIX GAIN
Q18, Q19
R-G MATRIX
Q20, Q21
B-(RG) MATRIX
Q22
BUFFER
Q24, Q25
BUFFER
TP13 (B OUT)
Q23
CLAMP
SW1 MATRIX ON/OFF SWITCH
OFF
ON
VR18 MATRIX LEVEL
+2.5V REGULATOR
IC8 (c)
+8.8V
+2.5V REGULATOR
+2.5V
+3V REGULATOR
IC14 (a)
+3V REGULATOR
+3V
+1.8V REGULATOR
IC14 (b)
+8V REGULATOR
+1.8V
Q26
BUFFER
CF1
L.P.F
Q38, Q39
AMP
VR 20 1H CCD GAIN
Q46
OBCP
CLAMP
Q52
BUFFER
Q53
CLAMP
Q56
CLAMP
Q67
CLAM
Q73, Q74 Q75
LEVEL DEPENDENT CONTROL
Q76
Q72
HIGH GAIN LEVEL DEPENDENT CONTROL
VR25 LEVEL DEPEN
VR26 HIGH G. LEVEL DEPEN.

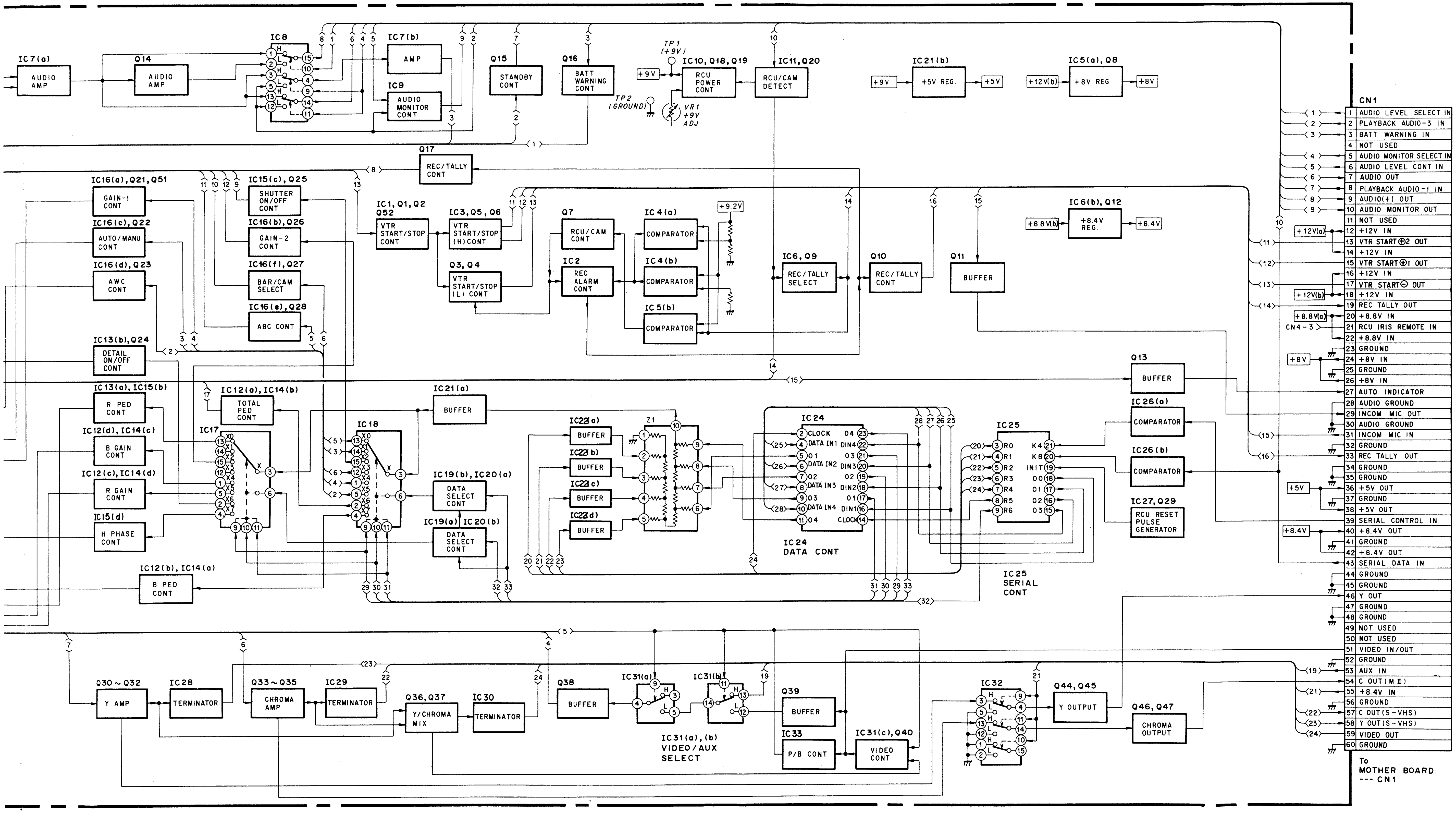
BLOCK DIAGRAM OF PROCESS/DETAIL BOARD


R.G.B PROCESS
TP3 (R PRO -2)
TP6 (G PRO -2)
TP9 (B PRO -2)
IC7
B IN
G IN
R IN
PKN
PED.R
R OUT
W.CUP
PULSE
WB.R
B OUT
PED.B
PKN
WB.B
G.OUT
PED.G
VR7 R PRE-KNEE
VR15 R PED
VR11 R/G/B WHITE CLIP
VR17 B PED
VR9 B PRE-KNEE
VR16 G PED
VR8 G PRE-KNEE
Q5
R BUFFER
Q6
CP
R CLAMP
Q7,Q8
R AMP
TP11 (R OUT)
Q9
G BUFFER
Q10
G CLAMP
Q11,Q12
G AMP
TP12 (G OUT)
Q13
B BUFFER
Q14
B CLAMP
Q15
B AMP
TP20 (PRE B)
MATRIX
VR31 MATRIX GAIN
Q18,Q19
R-G MATRIX
Q20, Q21
B-(RG) MATRIX
Q22
BUFFER
Q24,Q25
BUFFER
TP13 (B OUT)
Q23
CLAMP
SW1 MATRIX ON/OFF SWITCH
OFF
ON
VR18 MATRIX LEVEL
-4.4V
Q4
INVERTER
IC5(a),(b),(c),(d)
CP COMPENSATOR
Q17
GAIN-2 (+18dB) GAMMA CONTROL
VR10 R/G/B GAMMA
IC8(b)
R GAIN COMPARATOR
IC8(a)
B GAIN COMPARATOR
+2.5V REGULATOR
IC8(c)
+8.8V
+2.5V REGULATOR
+2.5V
+3V REGULATOR
IC14(a)
+3V REGULATOR
+3V
+1.8V REGULATOR
IC14(b)
+8V REGULATOR
+1.8V
1H DETAIL DELAY
Q26
BUFFER
CF1
L.P.F
Q27,Q28
AMP
TP14 (OH Y)
Q29
OBCP
CLAMP
Q30
AMP
IC9
OH Y GAMMA CORRECTION
Q33
CLAMP
VR19 1H CCD BIAS
Q34,Q35
AMP
IC10
1H DELAY
Q38,Q39
AMP
VR20 1H CCD GAIN
CF2
LPF
CF3
DL
Q51
BUFFER
Q50
CLAMP
Q49
AMP
IC12
1H Y GAMMA CORRECTION
2H DETAIL DELAY
Q44,Q45
AMP
IC11
1H DELAY
Q40,Q41
AMP
VR21 2H CCD GAIN
CF4
DL
Q46
CLAMP
VR22 2H CCD BIAS
DETAIL GENERATOR
Q52
BUFFER
Q53
CLAMP
Q56
CLAMP
Q54,Q55
AMP
TP17 (2H BIAS)
Q57,Q58
AMP
CF6,CF7
DL
Q81
BUFFER
VR32 H. APERTURE SYMMETRY
Q68
OHY/2HY MIX
Q69
BUFFER
VR24 APERTURE BAL
TP19 (1H BIAS)
IC13(a)
Q67
CLAMP
Q65,Q66
AMP
CF5
DL
Q63,Q64
AMP
Q62
BUFFER
TP16 (1H Y)
VR23 OUTPUT LEVEL
Q73,Q74 Q75
LEVEL DEPENDENT CONTROL
Q76
DETAIL CONTROL
IC15,Q77
DETAIL AMP
Q78
GAIN-1(+9dB) NOISE SUPRESS CONTROL
Q79
GAIN-2(+18dB) NOISE SUPRESS CONTROL
VR30 DTL GAIN
IC13(b)
H
L
Q80
BUFFER
TP18 (DETAIL)
VR29 NOISE SUPRESS
Q72
HIGH GAIN LEVEL DEPENDENT CONTROL
VR25 LEVEL DEPENDENT
VR26 HIGH GAIN LEVEL DEPENDENT
VR27 GAIN-1 NOISE SUPRESS
VR28 GAIN-2 NOISE SUPRESS
9
13
19
41
7
11
15
6
15
13
12
21
18
40
8
10
51
52
43
25
35
32
3

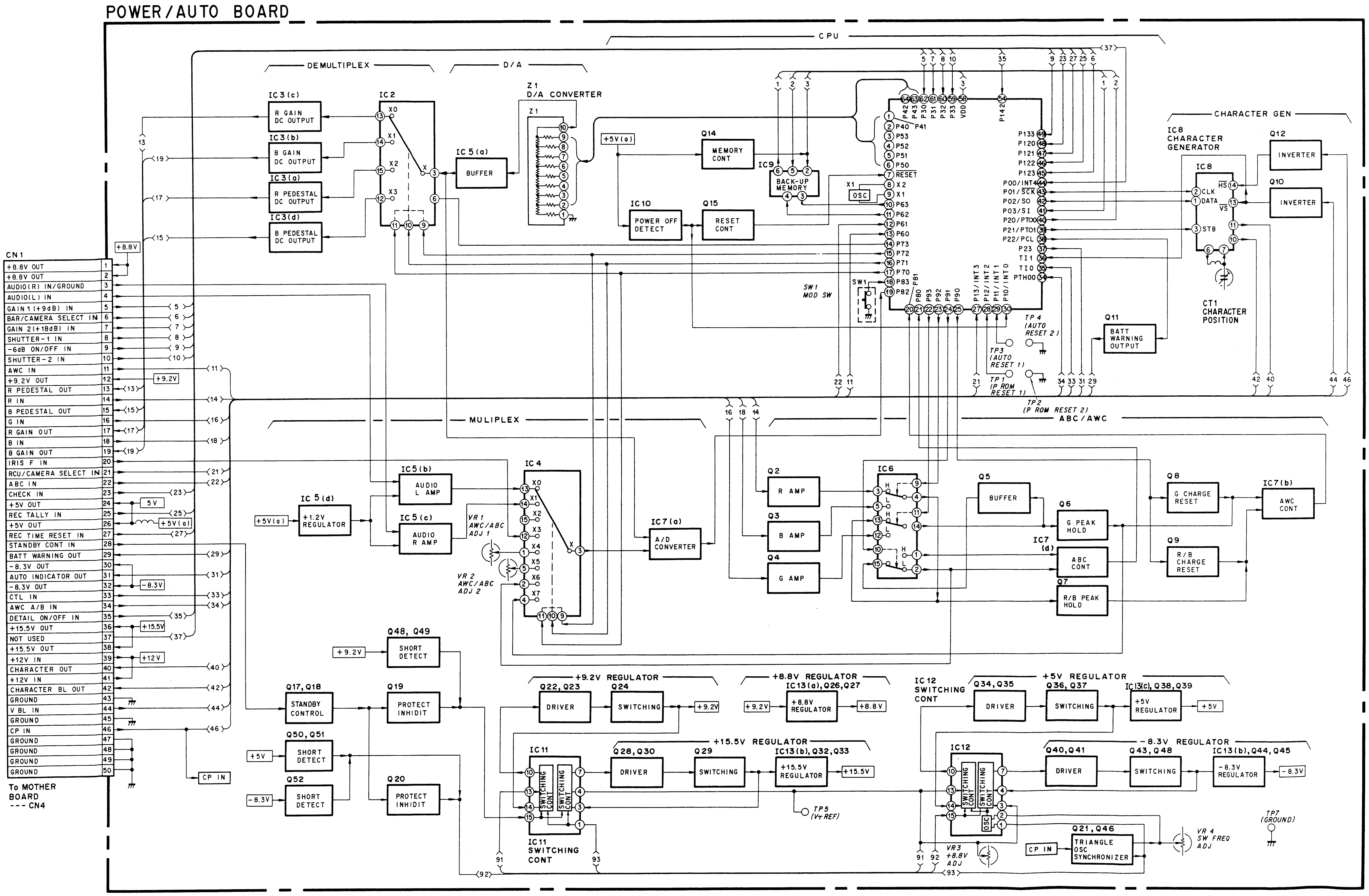
BLOCK DIAGRAM OF MAIN BOARD FOR CAMERA ADAPTOR


68PIN CONNECTOR BOARD
MAIN BOARD
CN1
1 +12V IN
2 +12V IN
3 MIC(L) IN
4 MIC(R) IN
5 +12V IN
6 MIC GROUND
7 AUDIO(L) OUT
8 AUDIO(R) OUT
9 AUDIO GROUND
10 AUDIO GROUND
11 STANDBY CONT OUT
12 VTR START/STOP IN
13 +12V IN
14 REC TALLY OUT
15 Y IN
16 C IN
17 GROUND
18 GROUND
19 REC TIME RESET OUT
20 RCU CAMERA SELECT OUT
21 +8.8V IN
22 RETURN VIDEO CONT IN
23 RETURN VIDEO OUT
24 RCU DETAIL ON/OFF OUT
25 GROUND
26 GROUND
27 RCU AWC CONT OUT
28 RCU ABC CONT OUT
29 GROUND
30 NOT USED
31 G/L VIDEO OUT
32 RCU IRIS REMOTE OUT
33 -8V IN
34 RCU H. PHASE OUT
35 AUTO INDICATOR IN
36 RCU/CAMERA SELECT OUT
37 VS IN
38 COLOR FRAME PULSE IN
39 BATT. WARNING OUT
40 VTR WARNING OUT
41 CTL IN
42 RCU GAIN-1(+9dB) CONT OUT
43 RCU SHUTTER ON/OFF OUT
44 RCU GAIN-2(+18dB) CONT OUT
45 +12V OUT
46 RCU AUTO/MANU CONT OUT
47 C SYNC IN
48 NOT USED
49 +12V OUT
50 NOT USED
51 NOT USED
52 NOT USED
53 RCU R PEDESTAL OUT
54 NOT USED
55 RCU T. PEDESTAL OUT
56 NOT USED
57 RCU B. PEDESTAL OUT
58 RCU R. GAIN OUT
59 NOT USED
60 RCU B GAIN OUT
61 GROUND
62 GROUND
63 NOT USED
64 GROUND
65 GROUND
66 GROUND
67 VIDEO IN
68 +5V IN
To CAMERA MOTHER BOARD ---CN5
+12V
J1
J2
BI6(E6)
1 MIC(R) OUT
2 MIC(L) OUT
3 MIC GROUND
4 AUDIO(L) IN
5 AUDIO GROUND
6 STANDBY CONT OUT
7 BATT WARNING IN
CN6
1 BATT WARNING OUT
2 STANDBY CONT IN
3 AUDIO(L) OUT
4 AUDIO GROUND
5 MIC (R) IN
6 MIC (L) IN
7 MIC GROUND
BI2(E2)
1 C OUT
2 GROUND
3 Y OUT
4 GROUND
5 RETURN VIDEO IN
6 GROUND
7 RETURN VIDEO CONT OUT
8 NOT USED
CN3
1 NOT USED
2 RETURN VIDEO OUT
3 GROUND
4 RETURN VIDEO CONT IN
5 C IN
6 GROUND
7 Y IN
8 GROUND
BI4(E4)
1 RCU AUTO/MANU CONT IN
2 RCU GAIN-2(+18dB) CONT IN
3 RCU SHUTTER ON/OFF IN
4 RCU GAIN-1(+9dB) CONT IN
5 RCU H. PHASE IN
6 RCU IRIS REMOTE IN
7 RCU ABC CONT IN
8 RCU AWC CONT IN
9 RCU DETAIL ON/OFF IN
10 RCU CAMERA CONT IN
11 REC TALLY IN
12 -8V OUT
CN4
1 REC TALLY OUT
2 RCU H. PHASE OUT
3 RCU IRIS REMOTE OUT
4 RCU SHUTTER ON/OFF OUT
5 RCU DETAIL ON/OFF OUT
6 RCU AWC CONT OUT
7 -8V IN
8 RCU/CAMERA SELECT OUT
9 RCU AUTO/MANU CONT OUT
10 RCU ABC CONT OUT
11 RCU GAIN-1(+9dB) CONT OUT
12 RCU GAIN-2(+18dB) CONT OUT
CN1-2
-8V
BI5(E5)
1 VTR START/STOP OUT
2 RCU/CAMERA SELECT IN
3 AUTO INDICATOR OUT
4 +8.8V OUT
CN7
1 VTR START/STOP IN
2 +8.8V IN
3 RCU/CAMERA SELECT OUT
4 AUTO INDICATOR IN
+8.8V(b)
BI3(E3)
1 RCU R PEDESTAL IN
2 RCU T PEDESTAL IN
3 RCU B PEDESTAL IN
4 RCU R GAIN IN
5 RCU B GAIN IN
CN5
1 RCU R PEDESTAL OUT
2 RCU B GAIN OUT
3 RCU R GAIN OUT
4 RCU B PEDESTAL OUT
5 RCU T PEDESTAL OUT
BI1(E1)
1 NOT USED
2 GROUND
3 NOT USED
4 GROUND
5 VIDEO OUT
6 GROUND
7 +5V OUT
CN2
1 +5V IN
2 NOT USED
3 GROUND
4 VIDEO IN
5 GROUND
6 NOT USED
7 GROUND
+5V
E9
E10
E7
E8
E11
CN2
1 +12V IN
2 +12V IN
3 GROUND
4 GROUND
5 GROUND
6 G/L VIDEO IN
To MOTHER BOARD
IC7(a) AUDIO AMP
Q14 AUDIO AMP
IC8
IC7(b) AMP
IC9 AUDIO MONITOR CONT
Q15 STANDBY CONT
Q16 BATT WARNING CONT
TP1 (+9V)
TP2 (GROUND)
+9V
IC10, Q18, Q19 RCU POWER CONT
VR1 +9V ADJ
IC11, Q20 RCU/CAM DETECT
Q17 REC/TALLY CONT
IC16(a), Q21, Q51 GAIN-1 CONT
IC15(c), Q25 SHUTTER ON/OFF CONT
IC16(c), Q22 AUTO/MANU CONT
IC16(b), Q26 GAIN-2 CONT
IC16(d), Q23 AWC CONT
IC16(f), Q27 BAR/CAM SELECT
IC16(e), Q28 ABC CONT
IC1, Q1, Q2 Q52 VTR START/STOP CONT
IC3, Q5, Q6 VTR START/STOP (H) CONT
Q3, Q4 VTR START/STOP (L) CONT
Q7 RCU/CAM CONT
IC2 REC ALARM CONT
IC4(a) COMPARATOR
IC4(b) COMPARATOR
IC5(b) COMPARATOR
+9.2V
IC6, Q9 REC/TALLY SELECT
IC13(b), Q24 DETAIL ON/OFF CONT
IC13(a), IC15(b) R PED CONT
IC12(a), IC14(b) TOTAL PED CONT
IC12(d), IC14(c) B GAIN CONT
IC12(c), IC14(d) R GAIN CONT
IC15(d) H PHASE CONT
IC17
IC18
IC12(b), IC14(a) B PED CONT
IC21(a) BUFFER
IC19(b), IC20(a) DATA SELECT CONT
IC19(a) IC20(b) DATA SELECT CONT
IC22(a) BUFFER
IC22(b) BUFFER
IC22(c) BUFFER
IC22(d) BUFFER
Z1
IC24
CLOCK
DATA IN1
DATA IN2
DATA IN3
DATA IN4
DIN4
DIN3
DIN2
DIN1
CLOCK
IC24 DATA CONT
Q30~Q32 Y AMP
IC28 TERMINATOR
Q33~Q35 CHROMA AMP
IC29 TERMINATOR
Q36, Q37 Y/CHROMA MIX
IC30 TERMINATOR
Q38 BUFFER
IC31(a)
IC31(b)
IC31(a), (b) VIDEO/AUX SELECT
Q39 BUFFER
IC33 P/B CONT

BLOCK DIAGRAM OF MAIN BOARD FOR CAMERA ADAPTOR


IC7(a)
AUDIO AMP
Q14
AUDIO AMP
IC8
IC7(b)
AMP
IC9
AUDIO MONITOR CONT
Q15
STANDBY CONT
Q16
BATT WARNING CONT
TP1 (+9V)
TP2 (GROUND)
IC10, Q18, Q19
RCU POWER CONT
+9V
VR1 +9V ADJ
IC11, Q20
RCU/CAM DETECT
IC21(b)
+9V
+5V REG.
+5V
IC5(a), Q8
+12V(b)
+8V REG.
+8V
Q17
REC/TALLY CONT
IC16(a), Q21, Q51
GAIN-1 CONT
IC15(c), Q25
SHUTTER ON/OFF CONT
IC16(c), Q22
AUTO/MANU CONT
IC16(b), Q26
GAIN-2 CONT
IC16(d), Q23
AWC CONT
IC16(f), Q27
BAR/CAM SELECT
IC16(e), Q28
ABC CONT
IC13(b), Q24
DETAIL ON/OFF CONT
IC1, Q1, Q2
Q52
VTR START/STOP CONT
IC3, Q5, Q6
VTR START/STOP (H) CONT
Q3, Q4
VTR START/STOP (L) CONT
Q7
RCU/CAM CONT
IC2
REC ALARM CONT
IC4(a)
COMPARATOR
+9.2V
IC4(b)
COMPARATOR
IC5(b)
COMPARATOR
IC6, Q9
REC/TALLY SELECT
Q10
REC/TALLY CONT
Q11
BUFFER
IC6(b), Q12
+8.8V(b)
+8.4V REG.
+8.4V
Q13
BUFFER
IC13(a), IC15(b)
R PED CONT
IC12(a), IC14(b)
TOTAL PED CONT
IC12(d), IC14(c)
B GAIN CONT
IC17
IC18
IC12(c), IC14(d)
R GAIN CONT
IC15(d)
H PHASE CONT
IC12(b), IC14(a)
B PED CONT
IC21(a)
BUFFER
IC19(b), IC20(a)
DATA SELECT CONT
IC19(a), IC20(b)
DATA SELECT CONT
IC22(a)
BUFFER
IC22(b)
BUFFER
IC22(c)
BUFFER
IC22(d)
BUFFER
Z1
IC24
CLOCK
DATA IN1
O1
DATA IN2
O2
DATA IN3
O3
DATA IN4
O4
DIN4
DIN3
DIN2
DIN1
CLOCK
IC24 DATA CONT
IC25
R0 R1 R2 R3 R4 R5 R6
K4 K8 INIT O0 O1 O2 O3
IC25 SERIAL CONT
IC26(a)
COMPARATOR
IC26(b)
COMPARATOR
IC27, Q29
RCU RESET PULSE GENERATOR
Q30 ~ Q32
Y AMP
IC28
TERMINATOR
Q33 ~ Q35
CHROMA AMP
IC29
TERMINATOR
Q36, Q37
Y/CHROMA MIX
IC30
TERMINATOR
Q38
BUFFER
IC31(a)
IC31(b)
IC31(a), (b) VIDEO/AUX SELECT
Q39
BUFFER
IC33
P/B CONT
IC31(c), Q40
VIDEO CONT
IC32
Q44, Q45
Y OUTPUT
Q46, Q47
CHROMA OUTPUT
+12V(a)
+12V(b)
+8.8V(a)
CN4-3
+8V
+5V
+8.4V
CN1
1 AUDIO LEVEL SELECT IN
2 PLAYBACK AUDIO-3 IN
3 BATT WARNING IN
4 NOT USED
5 AUDIO MONITOR SELECT IN
6 AUDIO LEVEL CONT IN
7 AUDIO OUT
8 PLAYBACK AUDIO-1 IN
9 AUDIO(+) OUT
10 AUDIO MONITOR OUT
11 NOT USED
12 +12V IN
13 VTR START⊕2 OUT
14 +12V IN
15 VTR START⊕1 OUT
16 +12V IN
17 VTR START⊖ OUT
18 +12V IN
19 REC TALLY OUT
20 +8.8V IN
21 RCU IRIS REMOTE IN
22 +8.8V IN
23 GROUND
24 +8V IN
25 GROUND
26 +8V IN
27 AUTO INDICATOR
28 AUDIO GROUND
29 INCOM MIC OUT
30 AUDIO GROUND
31 INCOM MIC IN
32 GROUND
33 REC TALLY OUT
34 GROUND
35 GROUND
36 +5V OUT
37 GROUND
38 +5V OUT
39 SERIAL CONTROL IN
40 +8.4V OUT
41 GROUND
42 +8.4V OUT
43 SERIAL DATA IN
44 GROUND
45 GROUND
46 Y OUT
47 GROUND
48 GROUND
49 NOT USED
50 NOT USED
51 VIDEO IN/OUT
52 GROUND
53 AUX IN
54 C OUT(M II)
55 +8.4V IN
56 GROUND
57 C OUT(S-VHS)
58 Y OUT(S-VHS)
59 VIDEO OUT
60 GROUND
To MOTHER BOARD --- CN1

BLOCK DIAGRAM OF POWER/AUTO BOARD


POWER/AUTO BOARD
CPU
DEMULTIPLEX
D/A
IC3(c) R GAIN DC OUTPUT
IC3(b) B GAIN DC OUTPUT
IC3(a) R PEDESTAL DC OUTPUT
IC3(d) B PEDESTAL DC OUTPUT
IC2
IC5(a) BUFFER
Z1 D/A CONVERTER
+5V(a)
Q14 MEMORY CONT
IC9 BACK-UP MEMORY
IC10 POWER OFF DETECT
Q15 RESET CONT
X1 OSC
SW1 MOD SW
RESET
TP4 (AUTO RESET 2)
TP3 (AUTO RESET 1)
TP1 (P ROM RESET 1)
TP2 (P ROM RESET 2)
CHARACTER GEN
IC8 CHARACTER GENERATOR
Q12 INVERTER
Q10 INVERTER
CT1 CHARACTER POSITION
Q11 BATT WARNING OUTPUT
CN1
+8.8V OUT
+8.8V OUT
AUDIO(R) IN/GROUND
AUDIO(L) IN
GAIN 1 (+9dB) IN
BAR/CAMERA SELECT IN
GAIN 2 (+18dB) IN
SHUTTER-1 IN
-6dB ON/OFF IN
SHUTTER-2 IN
AWC IN
+9.2V OUT
R PEDESTAL OUT
R IN
B PEDESTAL OUT
G IN
R GAIN OUT
B IN
B GAIN OUT
IRIS F IN
RCU/CAMERA SELECT IN
ABC IN
CHECK IN
+5V OUT
REC TALLY IN
+5V OUT
REC TIME RESET IN
STANDBY CONT IN
BATT WARNING OUT
-8.3V OUT
AUTO INDICATOR OUT
-8.3V OUT
CTL IN
AWC A/B IN
DETAIL ON/OFF IN
+15.5V OUT
NOT USED
+15.5V OUT
+12V IN
CHARACTER OUT
+12V IN
CHARACTER BL OUT
GROUND
V BL IN
GROUND
CP IN
GROUND
GROUND
GROUND
GROUND
To MOTHER BOARD --- CN4
MULIPLEX
ABC/AWC
IC5(b) AUDIO L AMP
IC5(c) AUDIO R AMP
IC5(d) +1.2V REGULATOR
VR1 AWC/ABC ADJ 1
VR2 AWC/ABC ADJ 2
IC4
IC7(a) A/D CONVERTER
Q2 R AMP
Q3 B AMP
Q4 G AMP
IC6
Q5 BUFFER
Q6 G PEAK HOLD
IC7(d) ABC CONT
Q7 R/B PEAK HOLD
Q8 G CHARGE RESET
Q9 R/B CHARGE RESET
IC7(b) AWC CONT
Q48, Q49 SHORT DETECT
Q17, Q18 STANDBY CONTROL
Q19 PROTECT INHIDIT
Q50, Q51 SHORT DETECT
Q52 SHORT DETECT
Q20 PROTECT INHIDIT
CP IN
+9.2V REGULATOR
Q22, Q23 DRIVER
Q24 SWITCHING
+8.8V REGULATOR
IC13(a), Q26, Q27 +8.8V REGULATOR
IC12 SWITCHING CONT
+5V REGULATOR
Q34, Q35 DRIVER
Q36, Q37 SWITCHING
IC13(c), Q38, Q39 +5V REGULATOR
IC11
+15.5V REGULATOR
Q28, Q30 DRIVER
Q29 SWITCHING
IC13(b), Q32, Q33 +15.5V REGULATOR
TP5 (VT REF)
IC11 SWITCHING CONT
IC12
-8.3V REGULATOR
Q40, Q41 DRIVER
Q43, Q48 SWITCHING
IC13(b), Q44, Q45 -8.3V REGULATOR
Q21, Q46 TRIANGLE OSC SYNCHRONIZER
VR3 +8.8V ADJ
VR4 SW FREQ ADJ
TP7 (GROUND)
SWITCHING CONT
OSC

CONDUCTOR VIEW OF PREAMP/DRIVE BOARD

<Index>

IC1	F2
IC2	E3
IC3	F3
IC4	E4
IC5	E4
IC101	D3
IC102	D3
IC103	C3
IC104	C3
IC105	B4
IC106	C3
IC107	C2
IC108	C2
IC301	B3
Q1	E2
Q2	F2
Q3	E2
Q4	E2
Q5	F2
Q6	F3
Q7	E3
Q8	E3
Q9	E3
Q10	F3
Q11	E3
Q12	E3
Q13	E4
Q14	E4
Q15	E4
Q16	E4
Q17	E3
Q22	E1
Q23	E2
Q24	E2
Q25	E2
Q26	F2
Q27	E2
Q101	E2
Q102	E2
Q103	E2
Q104	D3
Q105	D3
Q106	E3
Q107	E3
Q108	E4
Q109	E3
Q110	D3
Q111	D3
Q112	D3
Q113	B4
Q114	D4
Q115	D3
Q116	D2
Q117	D2
Q118	B4
Q119	C4
Q120	D4
Q121	C3
Q122	C2
Q123	C2
Q124	D2
Q125	D2
Q126	B2
Q127	B2
Q128	B2
Q129	B2
Q301	B4
Q302	B4
Q303	B3
Q304	B3
Q305	B3
Q306	B3
Q307	B4
Q308	B3
Q309	B4
Q310	B4
Q311	B4
Q312	B3
Q313	B3
Q314	A4
Q315	A4
Q316	B4
Q317	A3
Q318	A3
Q319	A3
Q320	A3
Q321	B3
Q322	A2
Q323	A3
Q324	B2
Q325	A2
Q326	A2
Q327	A2
Q328	B3
Q329	A3
Q330	A2
Q331	B2
Q332	B1
Q333	A2
Q334	A2
D1	F3
D101	E2
D102	E2
D103	E3
D104	D3
D105	D3
D106	D3
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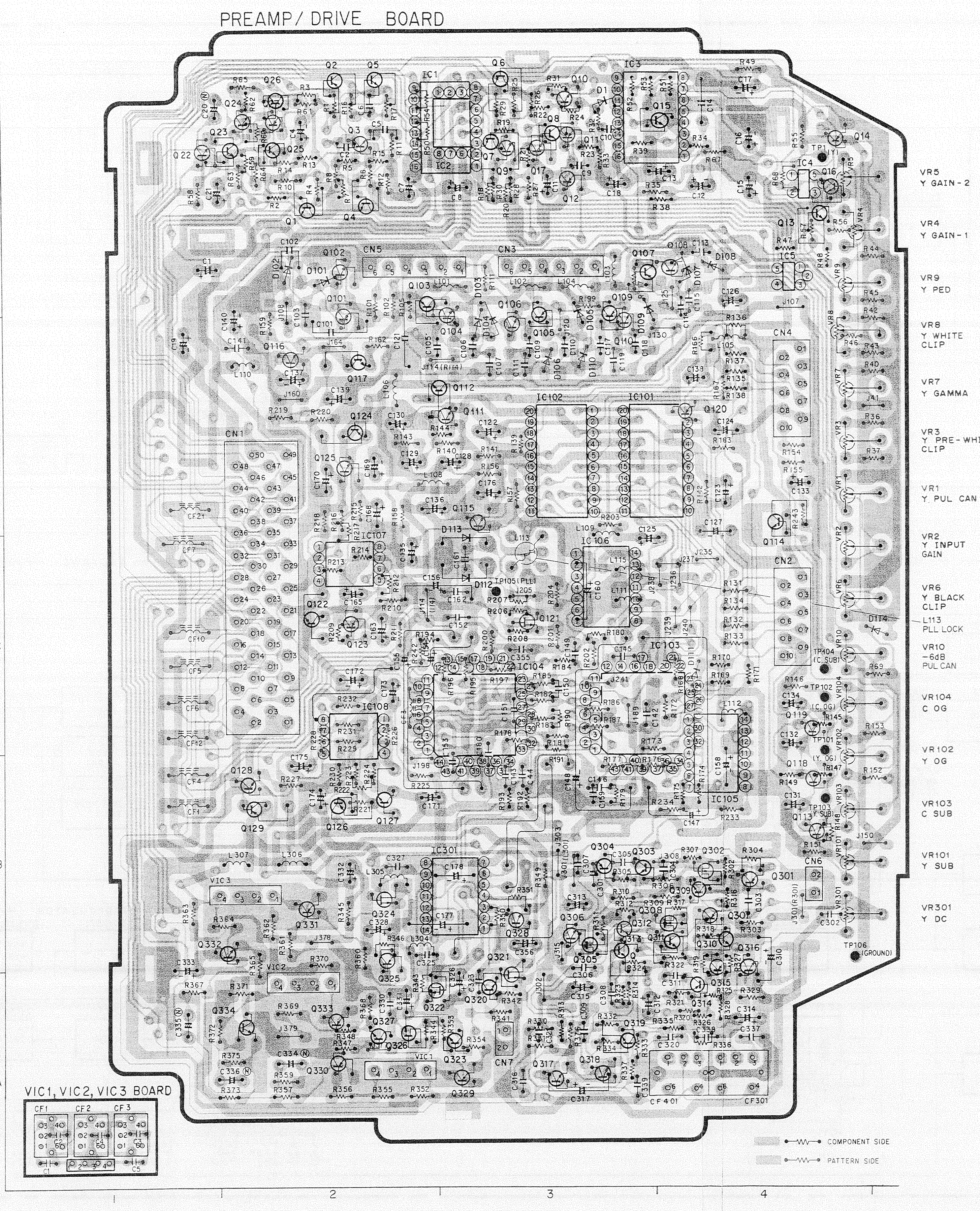
D111	C4
D112	C3
D113	C3
D114	C4


PREAMP/ DRIVE BOARD
VIC1, VIC2, VIC3 BOARD
F
E
D
C
B
A
1
2
3
4
VR5 Y GAIN-2
VR4 Y GAIN-1
VR9 Y PED
VR8 Y WHITE CLIP
VR7 Y GAMMA
VR3 Y PRE-WHITE CLIP
VR1 Y PUL CAN
VR2 Y INPUT GAIN
VR6 Y BLACK CLIP
L113 PLL LOCK
VR10 -6dB PUL CAN
VR104 C OG
VR102 Y OG
VR103 C SUB
VR101 Y SUB
VR301 Y DC
TP1
TP104 (C.SUB)
TP102
TP101
TP103
TP106 (GROUND)
TP105(PLL)
CN1
CN2
CN3
CN4
CN5
CN6
CN7
IC1
IC2
IC3
IC4
IC5
IC101
IC102
IC103
IC104
IC105
IC106
IC108
IC301
VIC1
VIC2
VIC3
CF1
CF2
CF3
CF401
CF301
COMPONENT SIDE
PATTERN SIDE

<Voltages>

	IC1	IC2	IC3	IC4	IC5	IC101	IC102	IC105	IC106	IC107	IC108	IC301
Pin 1	-0.1	2.4	2.4	0	0	-0.7	-7.0	-1.0	0	0.6	-0.7	2.8
2	-	0	3.9	0	8.8	0.7	0.7	0	5.0	3.7	-	2.8
3	0	2.5	0.1	0	0	1.0	0	0.1	2.7	3.7	0.1	2.7
4	0.1	0	0	8.8	0	0	0	0.1	2.7	-8.3	8.3	2.7
5	0.1	0.4	0	8.8	8..8	0.7	0.7	0.1	2.7	-2.0		0.3
6	0	0.3	3.9			5.0	5.0	0.1	-	-2.0	1.2	0.3
7	-8.3	7.6	0			0	0	0	0	-0.5	1.2	0
8	0	8.8	0			0	0	-	5.0	5.0	0.8	2.7
9	1.8		2.3			4.9	4.9	0	0		5.0	2.7
10	1.8		3.1			0	0.2	5.0	5.0			2.7
11	6.7		3.2			4.7	4.7		0			2.7
12	-0.8		3.7			0	4.9		5.0			0.3
13	2.5		0			4.7	4.7		0			1.1
14	2.5		0.2			0	0		5.0			4.8
15	0		3.8			0	0					
16	8.8		8.8			12.9	12.9					
17						0	0					
18						-6.6	-6.6					
19						1.0	0					
20						0	-6.6					

	IC103	IC104		IC103	IC104
Pin1	-	5.0	Pin23	4.9	5.0
2	-	0	24	2.6	0
3	-	2.5	25	2.0	0
4	-	5.0	26	4.6	-
5	0	.	27	12.8	-
6	0	5.0	28	-	-
7	0.5	-	29	-2.6	-
8	0	0.8	30	0	0
9	0	0.8	31	-9.5	-
10	1.1	0.6	32	0	-
11	0	2.3	33	-7.9	-
12	-	0	34	-2.3	-
13	5.0	5.0	35	-2.2	-8.9
14	0.1	5.0	36	0	0.1
15	0.2	5.0	37	0	1.1
16	0.1	5.0	38	-5.6	4.8
17	4.9	5.0	39	0	0
18	0	0	40	0	5.0
19	4.7	5.0	41	4.9	1.1
20	4.7	0	42	0	0.1
21	4.9	0	43	0	5.0
22	4.9	0	44	2.5	0

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q22	Q23	Q24
B	0	8.8	-0.1	2.7	0	0.7	0.7	0.1	0.1	0	0	4.7	0	0	3.1	0	0.1	2.7	2.5	2.0
C	8.8	0	3.2	8.8	0.1	-8.3	-8.3	8.8	0	4.1	0	0	0.1	0	8.8	8.7	0	8.8	2.6	8.8
E	0.6	8.8	0.5	3.3	0	0.1	0.1	0.7	-5.5	0.6	4.0	6.0	-1.0	2.1	3.7	-1.0	-2.0	3.3	0.2	2.6

	Q25	Q26	Q27	Q101	Q102	Q103	Q104	Q105	Q106	Q107	Q108	Q109	Q110	Q111	Q112	Q113	Q114	Q115	Q116	Q117
B	2.0	8.8	2.6	8.0	0	8.0	0	8.0	0	8.0	0	8.0	0	1.0	1.0	10.0	14.8	12.9	8.0	8.7
C	8.7	2.0	0	-5.5	-4.3	-	-	-	-	-	20.1	-	20.0	5.0	5.0	14.9	14.9	14.9	8.7	8.7
E	2.4	8.7	2.0	8.3	0.6	7.8	0.1	7.8	0	7.9	0.1	7.9	0.2	1.6	1.6	10.6	14.9	13.5	8.7	8.0

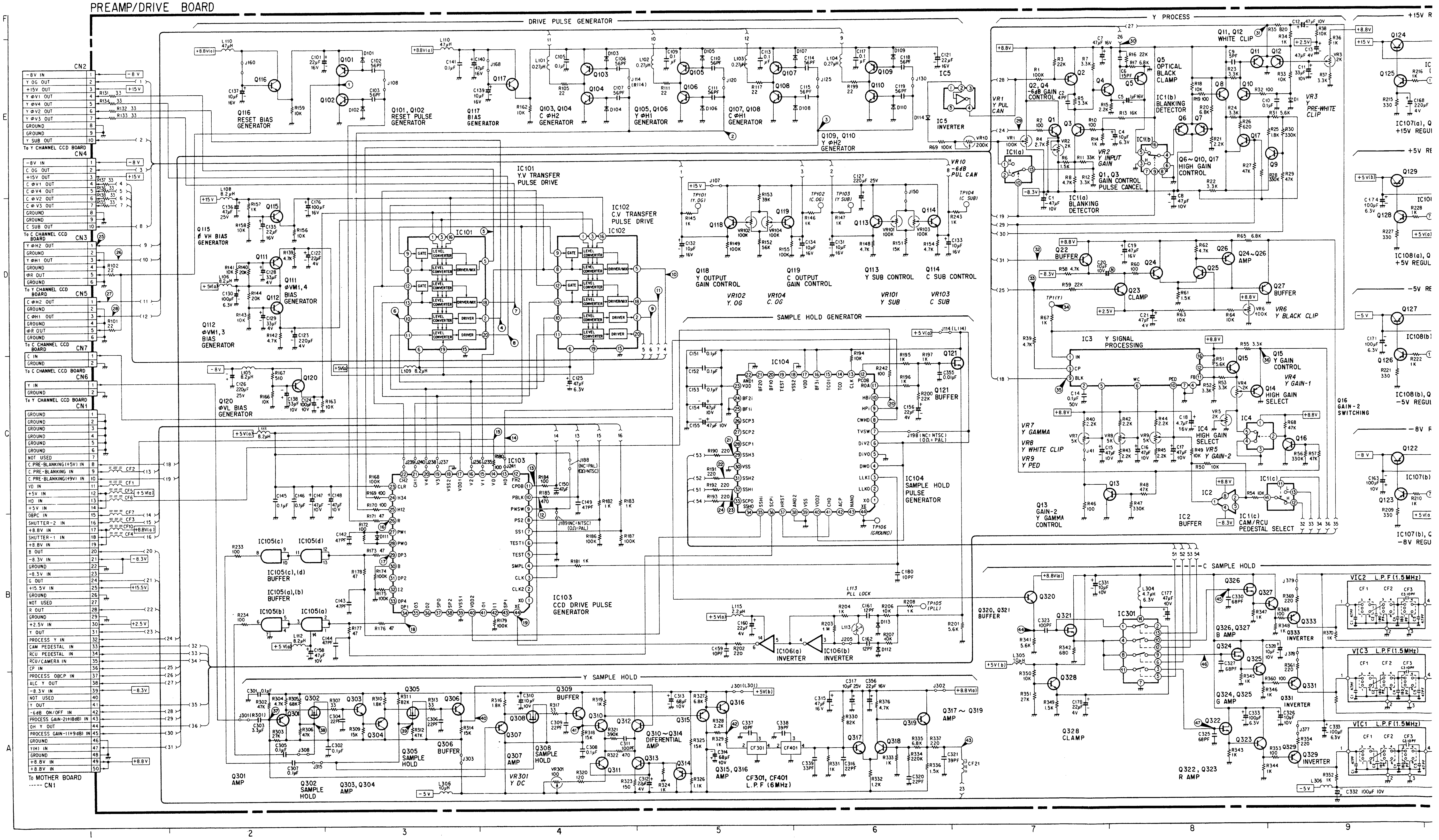
	Q118	Q119	Q120	Q121	Q122	Q123	Q124	Q125	Q126	Q127	Q128	Q129	Q301	Q303	Q304	Q306	Q307	Q309	Q310	Q311
B	8.5	8.5	-7.0	G2.3	-7.7	0	14.8	0.1	-0.1	-7.7	0.2	4.3	-0.5	-0.8	-1.3	-1.6	-0.6	-1.3	-2.0	-4.3
C	14.9	14.9	-8.1	D4.9	-8.0	-7.7	14.9	14.8	-7.7	-4.9	4.3	4.8	-4.9	-4.9	4.8	4.8	-4.9	4.8	0.1	-2.0
E	9.1	9.1	-7.7	S2.6	-8.3	-0.5	15.4	0.6	-0.7	-8.3	0.8	5.0	-1.1	-1.3	-0.6	-0.9	-1.2	-0.6	-1.3	-3.6

	Q312	Q313	Q314	Q315	Q316	Q317	Q318	Q319	Q320	Q321	Q322	Q323	Q324	Q325	Q326	Q327	Q328	Q329	Q330	Q331
B	-2.3	-4.3	-3.6	0.7	0.1	-0.5	-0.5	0.7	7.6	G2.8	G2.7	4.8	G2.7	2.1	G2.7	2.1	2.8	2.8	-0.9	2.8
C	4.8	-2.3	-4.9	-4.9	4.8	8.8	1.3	8.8	8.8	D4.8	D4.8	4.8	D4.8	4.8	D4.8	4.8	4.8	-0.3	4.7	-0.4
E	-1.6	-3.6	-4.3	0.1	0.7	0.1	0.1	1.3	8.2	S2.7	S2.8	2.1	S2.8	2.8	S4.8	-	3.4	2.1	-0.3	2.1

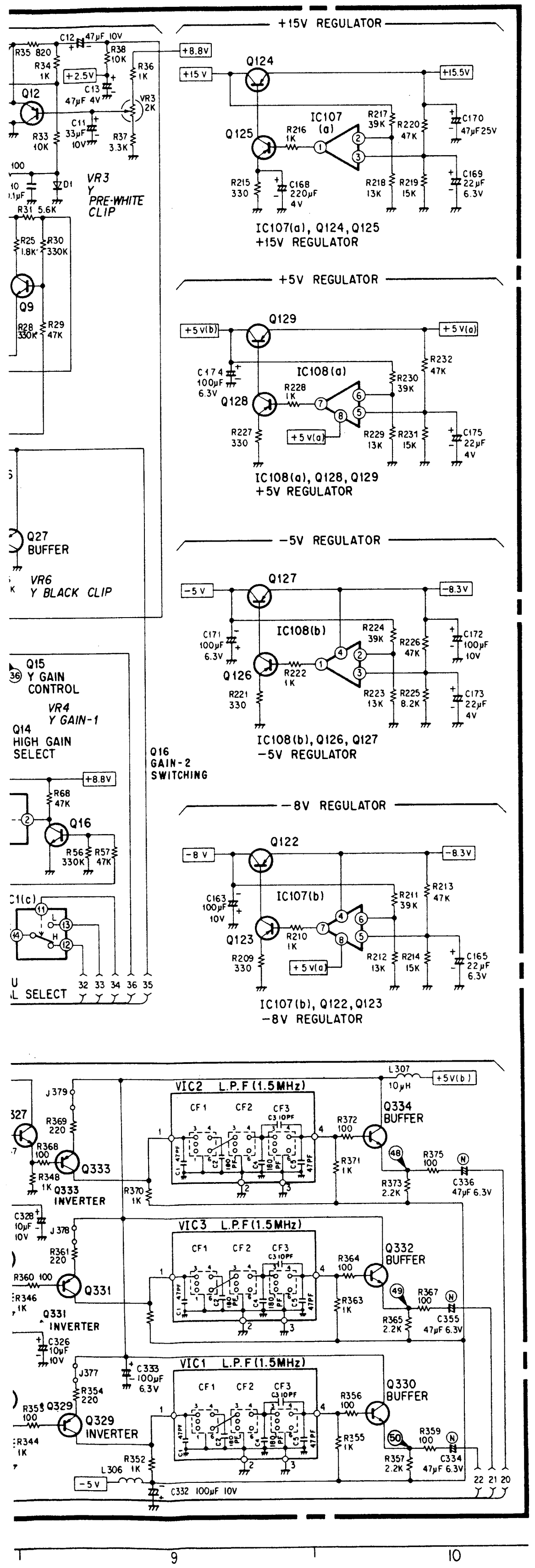
	Q332	Q333	Q344
B	-0.1	2.7	-0.9
C	4.7	-0.2	4.7
E	-0.4	2.1	-0.2

	G	D	S	Sub
Q302	-1.3	-0.6	-0.6	-4.9
Q305	-1.6	-0.7	-0.9	-4.9
Q308	-1.6	-0.6	-1.6	-4.9

SCHEMATIC DIAGRAM OF PREAMP


PREAMP/DRIVE BOARD
DRIVE PULSE GENERATOR
Y PROCESS
+15V
CN2
To Y CHANNEL CCD BOARD CN4
To C CHANNEL CCD BOARD CN3
To Y CHANNEL CCD BOARD CN5
To C CHANNEL CCD BOARD CN7
To C CHANNEL CCD BOARD CN6
To Y CHANNEL CCD BOARD CN1
To MOTHER BOARD ----- CN1
Q116 RESET BIAS GENERATOR
Q101, Q102 RESET PULSE GENERATOR
Q117 BIAS GENERATOR
Q103, Q104 C φH2 GENERATOR
Q105, Q106 Y φH1 GENERATOR
Q107, Q108 C φH1 GENERATOR
Q109, Q110 Y φH2 GENERATOR
IC5 INVERTER
VR10 -6dB PUL CAN
IC101 Y.V TRANSFER PULSE DRIVE
IC102 C.V TRANSFER PULSE DRIVE
Q115 φ VH BIAS GENERATOR
Q111 φVM1, 4 BIAS GENERATOR
Q112 φVM1, 3 BIAS GENERATOR
Q120 φVL BIAS GENERATOR
Q118 Y OUTPUT GAIN CONTROL
Q119 C OUTPUT GAIN CONTROL
Q113 Y SUB CONTROL
Q114 C SUB CONTROL
VR102 Y. OG
VR104 C. OG
VR101 Y SUB
VR103 C SUB
SAMPLE HOLD GENERATOR
IC104 SAMPLE HOLD PULSE GENERATOR
IC103 CCD DRIVE PULSE GENERATOR
IC105(c),(d) BUFFER
IC105(a),(b) BUFFER
IC106(a) INVERTER
IC106(b) INVERTER
L113 PLL LOCK
Y SAMPLE HOLD
Q301 AMP
Q302 SAMPLE HOLD
Q303, Q304 AMP
Q305 SAMPLE HOLD
Q306 BUFFER
Q307 AMP
Q308 SAMPLE HOLD
Q309 BUFFER
VR301 Y DC
Q310~Q314 DIFFERENTIAL AMP
Q315, Q316 AMP
CF301, CF401 L.P.F (6MHz)
Q317~Q319 AMP
VR1 Y PUL CAN
Q2, Q4 -6dB GAIN CONTROL
Q5 OPTICAL BLACK CLAMP
IC1(b) BLANKING DETECTOR
Q11, Q12 WHITE CLIP
VR3 Y PRE-WHITE CLIP
VR2 Y INPUT GAIN
Q1, Q3 GAIN CONTROL PULSE CANCEL
IC1(a) BLANKING DETECTOR
Q6~Q10, Q17 HIGH GAIN CONTROL
Q22 BUFFER
Q24~Q26 AMP
Q23 CLAMP
Q27 BUFFER
VR6 Y BLACK CLIP
IC3 Y SIGNAL PROCESSING
Q15 Y GAIN CONTROL
VR4 Y GAIN-1
Q14 HIGH GAIN SELECT
VR7 Y GAMMA
VR8 Y WHITE CLIP
VR9 Y PED
IC4 HIGH GAIN SELECT
VR5 Y GAIN-2
Q16 GAIN-2 SWITCHING
Q13 GAIN-2 Y GAMMA CONTROL
IC2 BUFFER
IC1(c) CAM/RCU PEDESTAL SELECT
C SAMPLE HOLD
Q320, Q321 BUFFER
Q326, Q327 B AMP
Q333 INVERTER
Q324, Q325 G AMP
Q331 INVERTER
Q328 CLAMP
Q322, Q323 R AMP
Q329 INVERTER
VIC2 L.P.F (1.5MHz)
VIC3 L.P.F (1.5MHz)
VIC1 L.P.F (1.5MHz)
IC107(a), Q +15V REGU
IC108(a), Q +5V REGU
IC108(b), Q -5V REGU
IC107(b), C -8V REGU
1 2 3 4 5 6 7 8 9
A B C D E F

AM OF PREAMP/DRIVE BOARD


+15V REGULATOR
Q124
IC107 (a)
Q125
IC107(a), Q124, Q125
+15V REGULATOR
VR3
Y
PRE-WHITE
CLIP
+5V REGULATOR
Q129
IC108(a)
Q128
IC108(a), Q128, Q129
+5V REGULATOR
Q27
BUFFER
VR6
Y BLACK CLIP
-5V REGULATOR
Q127
IC108(b)
Q126
IC108(b), Q126, Q127
-5V REGULATOR
Q15
Y GAIN
CONTROL
VR4
Y GAIN-1
Q14
HIGH GAIN
SELECT
Q16
GAIN-2
SWITCHING
-8V REGULATOR
Q122
IC107(b)
Q123
IC107(b), Q122, Q123
-8V REGULATOR
VIC2 L.P.F(1.5MHz)
Q334
BUFFER
Q333
INVERTER
VIC3 L.P.F(1.5MHz)
Q332
BUFFER
Q331
INVERTER
VIC1 L.P.F(1.5MHz)
Q330
BUFFER
Q329
INVERTER
9
10

<Index>

IC1	C9, E7, E8	Q121	C7
IC2	C8	Q122	C9
IC3	C8	Q123	C9
IC4	C8	Q124	E9
IC5	E7	Q125	E9
IC101	D3	Q126	C9
IC102	D4	Q127	D9
IC103	B3	Q128	D9
IC104	C6	Q129	E9
IC105	B2	Q301	A2
IC106	B5, B6	Q302	A2
IC107	C10, E10	Q303	A3
IC108	C10, D10	Q304	A3
IC301	B8	Q305	A3
Q1	E7	Q306	A3
Q2	E7	Q307	A4
Q3	E7	Q308	A4
Q4	E8	Q309	A4
Q5	E8	Q310	A4
Q6	E8	Q311	A4
Q7	E8	Q312	A5
Q8	E8	Q313	A5
Q9	E9	Q314	A5
Q10	E8	Q315	A5
Q11	E8	Q316	A5
Q12	E9	Q317	A6
Q13	C8	Q318	A6
Q14	C8	Q319	A6
Q15	C8	Q320	B7
Q16	C9	Q321	B7
Q17	E8	Q322	A8
Q22	D7	Q323	A8
Q23	D8	Q324	B8
Q24	D8	Q325	A8
Q25	D8	Q326	B8
Q26	D8	Q327	B9
Q27	D9	Q328	A7
Q101	E3	Q329	A9
Q102	E3	Q330	A10
Q103	E4	Q331	A9
Q104	E4	Q332	A10
Q105	E5	Q333	B9
Q106	E5	Q334	B10
Q107	E5	D1	E9
Q108	E5	D101	E3
Q109	E6	D102	E3
Q110	E6	D103	E4
Q111	D2	D104	E4
Q112	D2	D105	E5
Q113	D6	D106	E5
Q114	D6	D107	E6
Q115	D2	D108	E6
Q116	E2	D109	E6
Q117	E4	D110	E6
Q118	D5	D111	B3
Q119	D5	D112	B6
Q120	C2	D113	B6
		D114	E6

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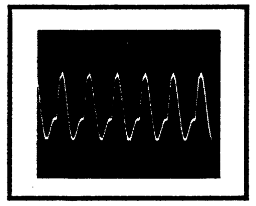
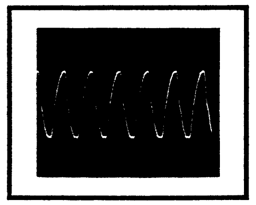

1. 2V/DIV, 50nsec/DIV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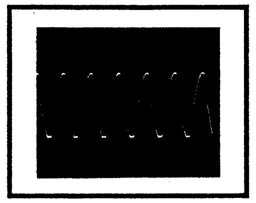
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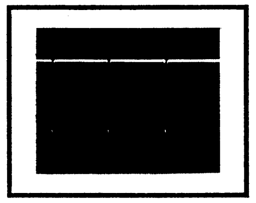
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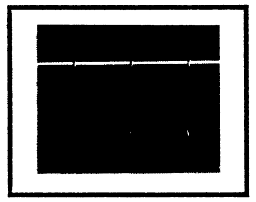
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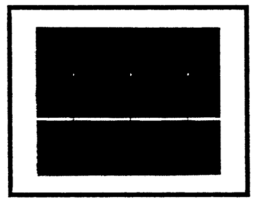
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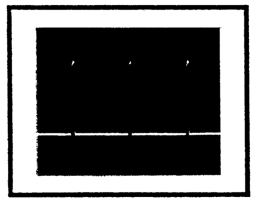
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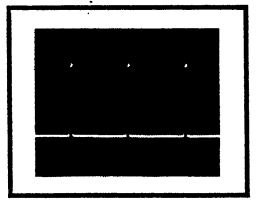
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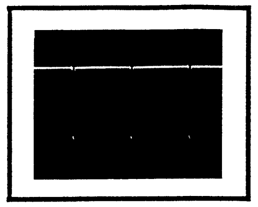
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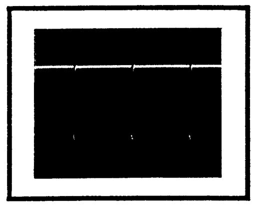
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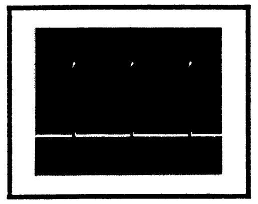
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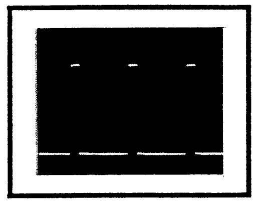
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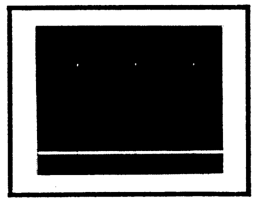
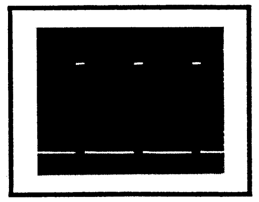

13. 1V/DIV, 20μsec/DIV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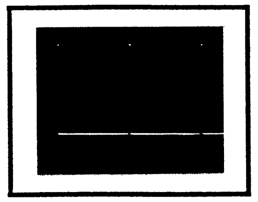
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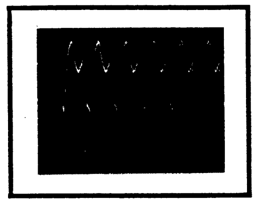
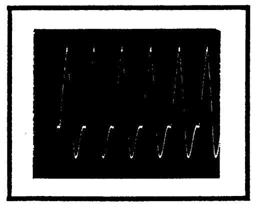

16. 0.5V/DIV, 50nsec/DIV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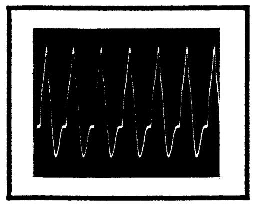
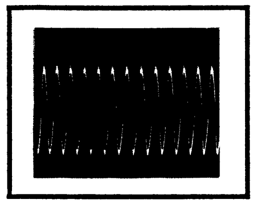
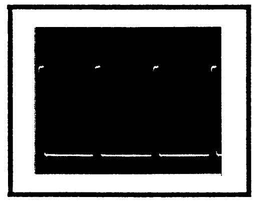

18. 1V/DIV, 50nsec/DIV


19. 0.2V/DIV, 50nsec/DIV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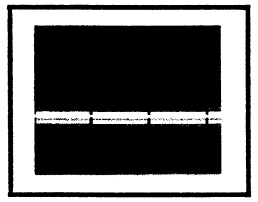
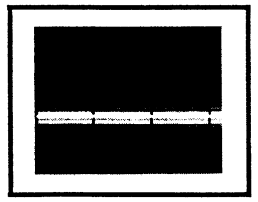
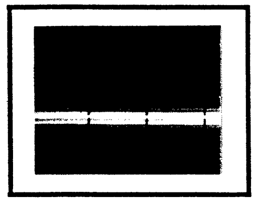
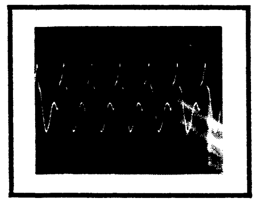
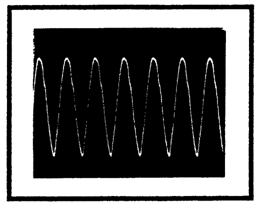

21. 2V/DIV, 20μsec/DIV


22. 2V/DIV, 20μsec/DIV


23. 2V/DIV, 20μsec/DIV


24. 2V/DIV, 50nsec/DIV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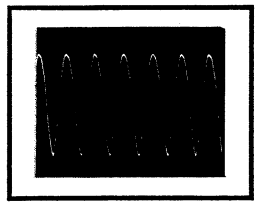
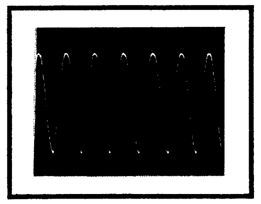
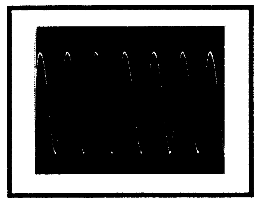
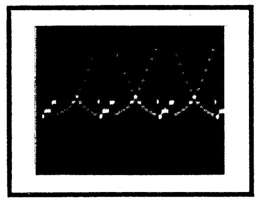
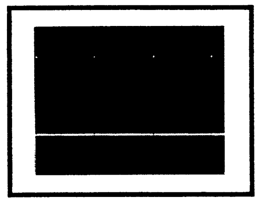
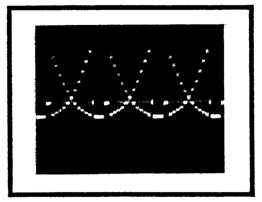

26. 2V/DIV, 50nsec/DIV


27. 2V/DIV, 50nsec/DIV


28. 2V/DIV, 50nsec/DIV


29. 0.2V/DIV, 20μsec/DIV


30. 2V/DIV, 20μsec/DIV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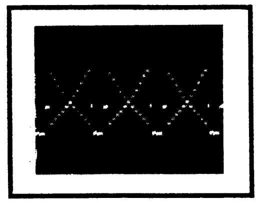
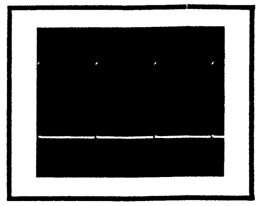
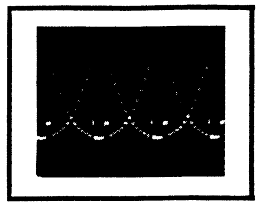
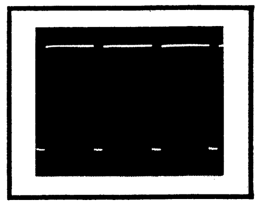
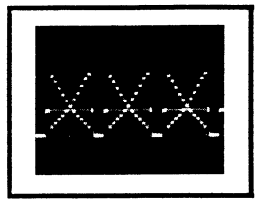
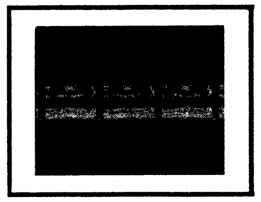

32. 0.2V/DIV, 20μsec/DIV

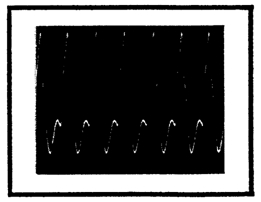

33. 2V/DIV, 20μsec/DIV

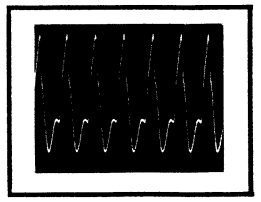

34. 0.1V/DIV, 20μsec/DIV

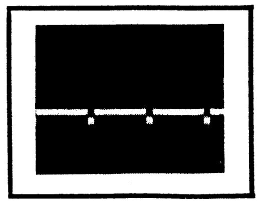

35. 0.5V/DIV, 20μsec/DIV

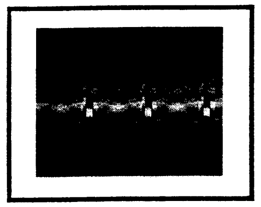

36. 0.2V/DIV, 20μsec/DIV

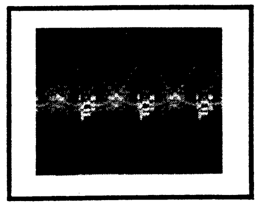

37. 0.1V/DIV, 20μsec/DIV

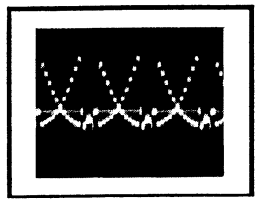

38. 1V/DIV, 50nsec/DIV

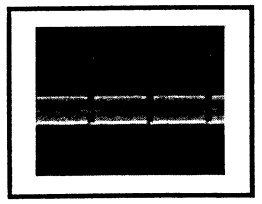

39. 1V/DIV, 50nsec/DIV

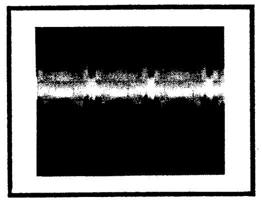

40. 0.1V/DIV, 20μsec/DIV

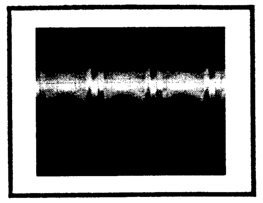

41. 0.1V/DIV, 20μsec/DIV

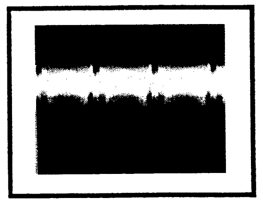

42. 0.1V/DIV, 20μsec/DIV

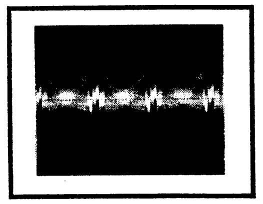

43. 0.2V/DIV, 20μsec/DIV

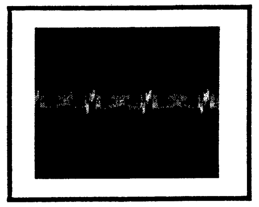

44. 0.1V/DIV, 20μsec/DIV


45. 50mV/DIV, 20μsec/DIV


46. 50mV/DIV, 20μsec/DIV


47. 50mV/DIV, 20μsec/DIV


48. 50mV/DIV, 20μsec/DIV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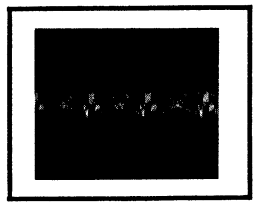
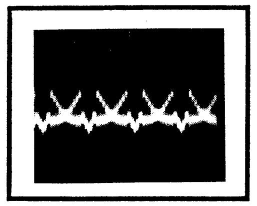
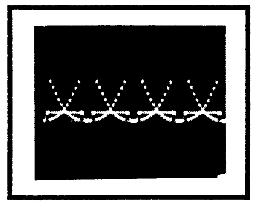
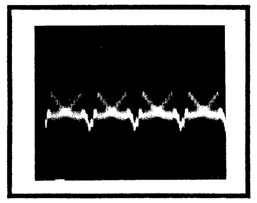

50. 50mV/DIV, 20μsec/DIV

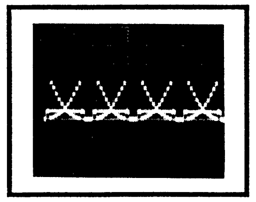
<Waveforms>

SCHEMATIC DIAGRAM OF PROCE


1. 50mV/DIV, 20μsec/DIV


2. 0.2V/DIV, 20μsec/DIV


3. 50mV/DIV, 20μsec/DIV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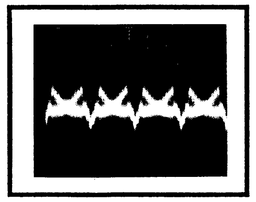
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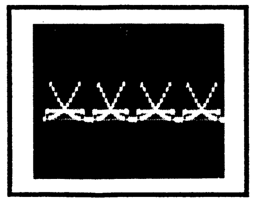
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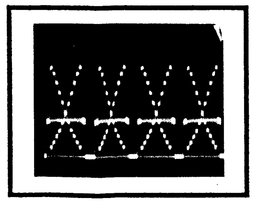
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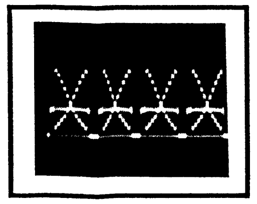
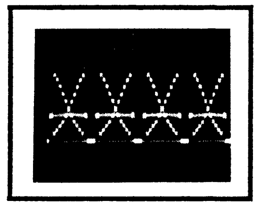
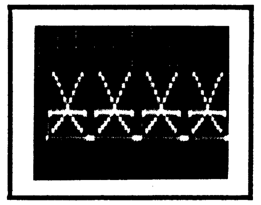
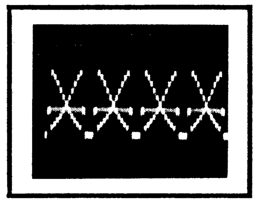

8. 0.2V/DIV, 20μsec/DIV


9. 0.2V/DIV, 20μsec/DIV


10. 0.2V/DIV, 20μsec/DIV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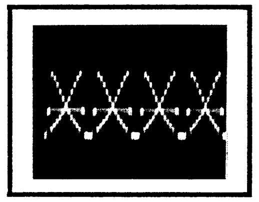
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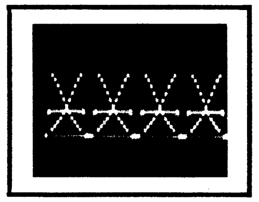
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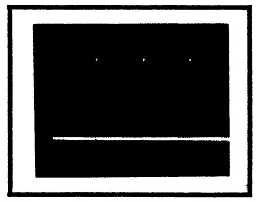
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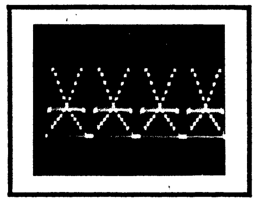
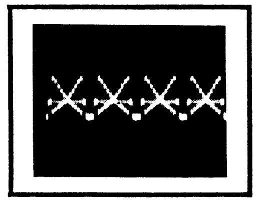
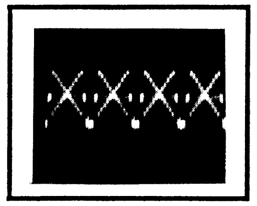

15. 0.2V/DIV, 20μsec/DIV


16. 0.1V/DIV, 20μsec/DIV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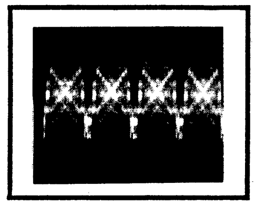
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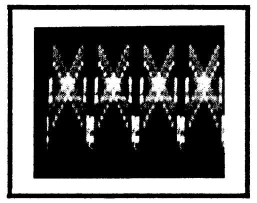
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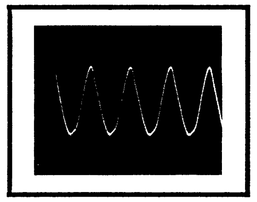
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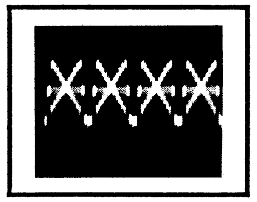
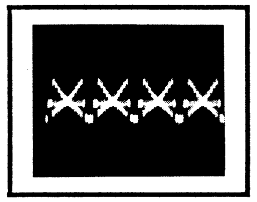

21. 0.1V/DIV, 20μsec/DIV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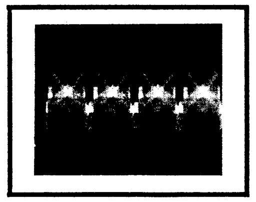
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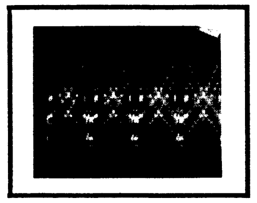
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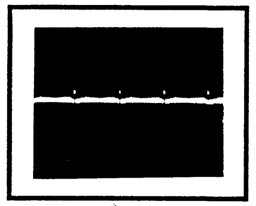
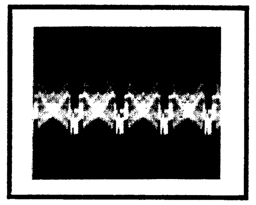
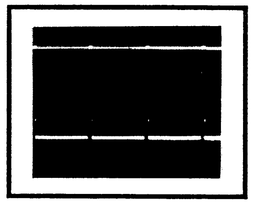
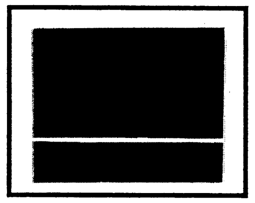
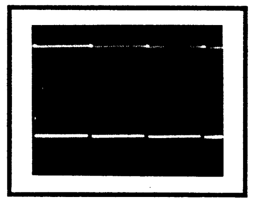
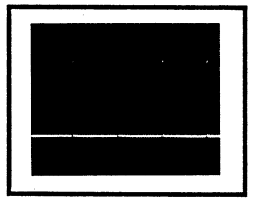

25. 20mV/DIV, 20μsec/DIV


26. 0.1V/DIV, 20μsec/DIV


27. 1V/DIV, 5msec/DIV


28. 2V/DIV, 5msec/DIV


29. 1V/DIV, 5msec/DIV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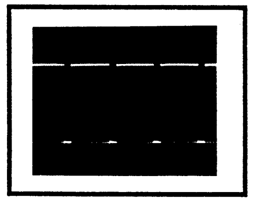
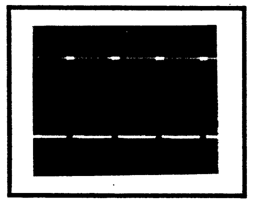

31. 2V/DIV, 20μsec/DIV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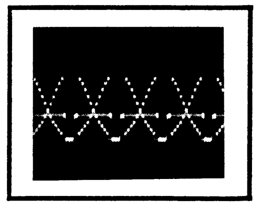
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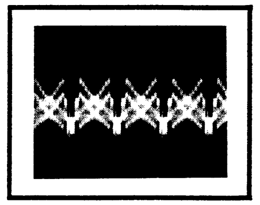
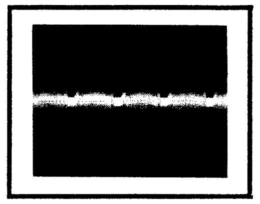

34. 0.1V/DIV, 20μsec/DIV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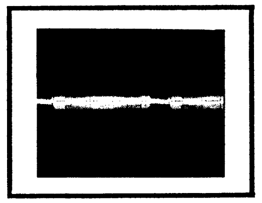
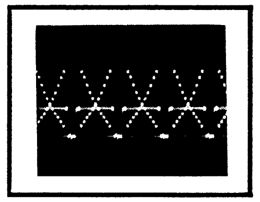
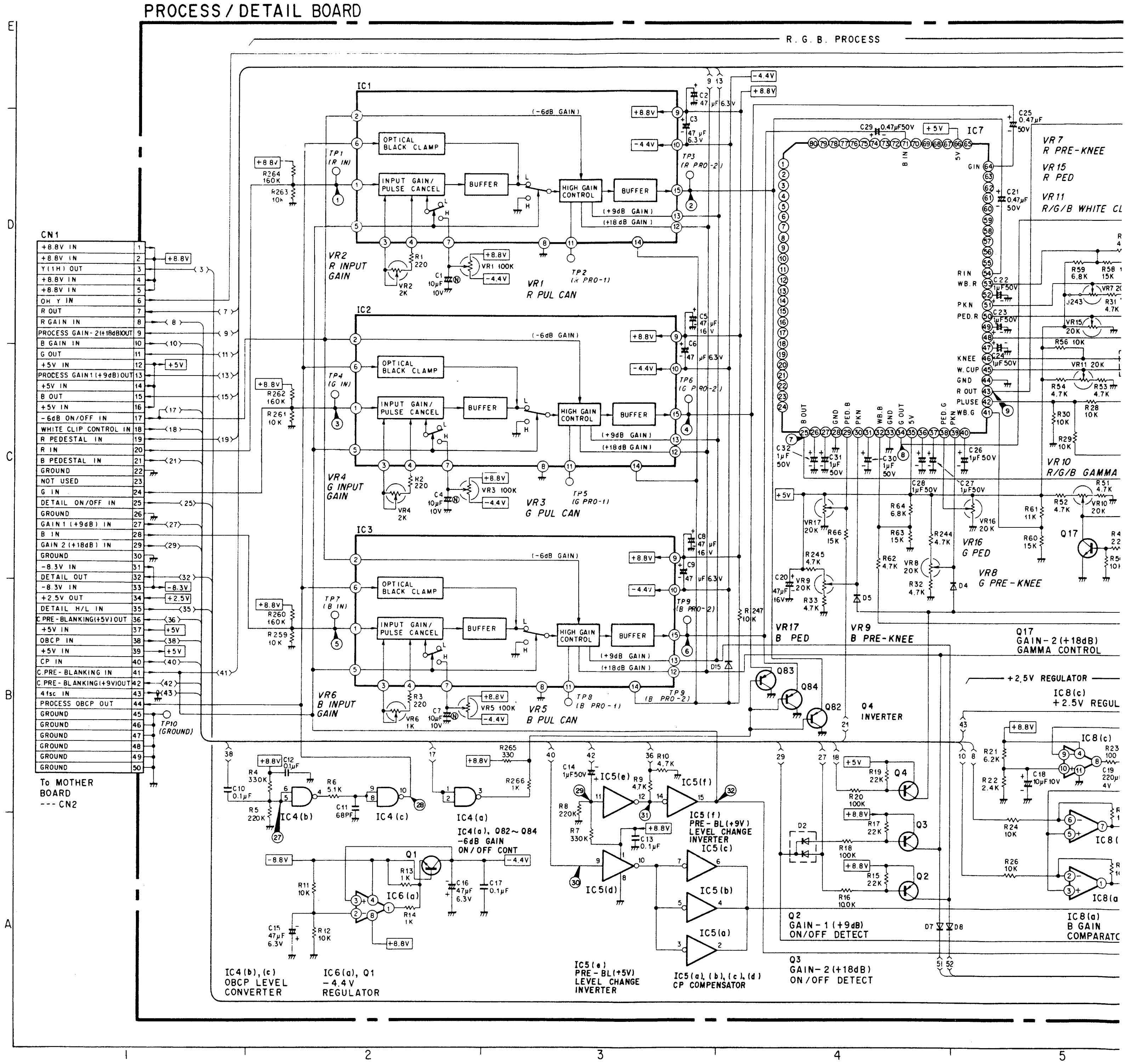
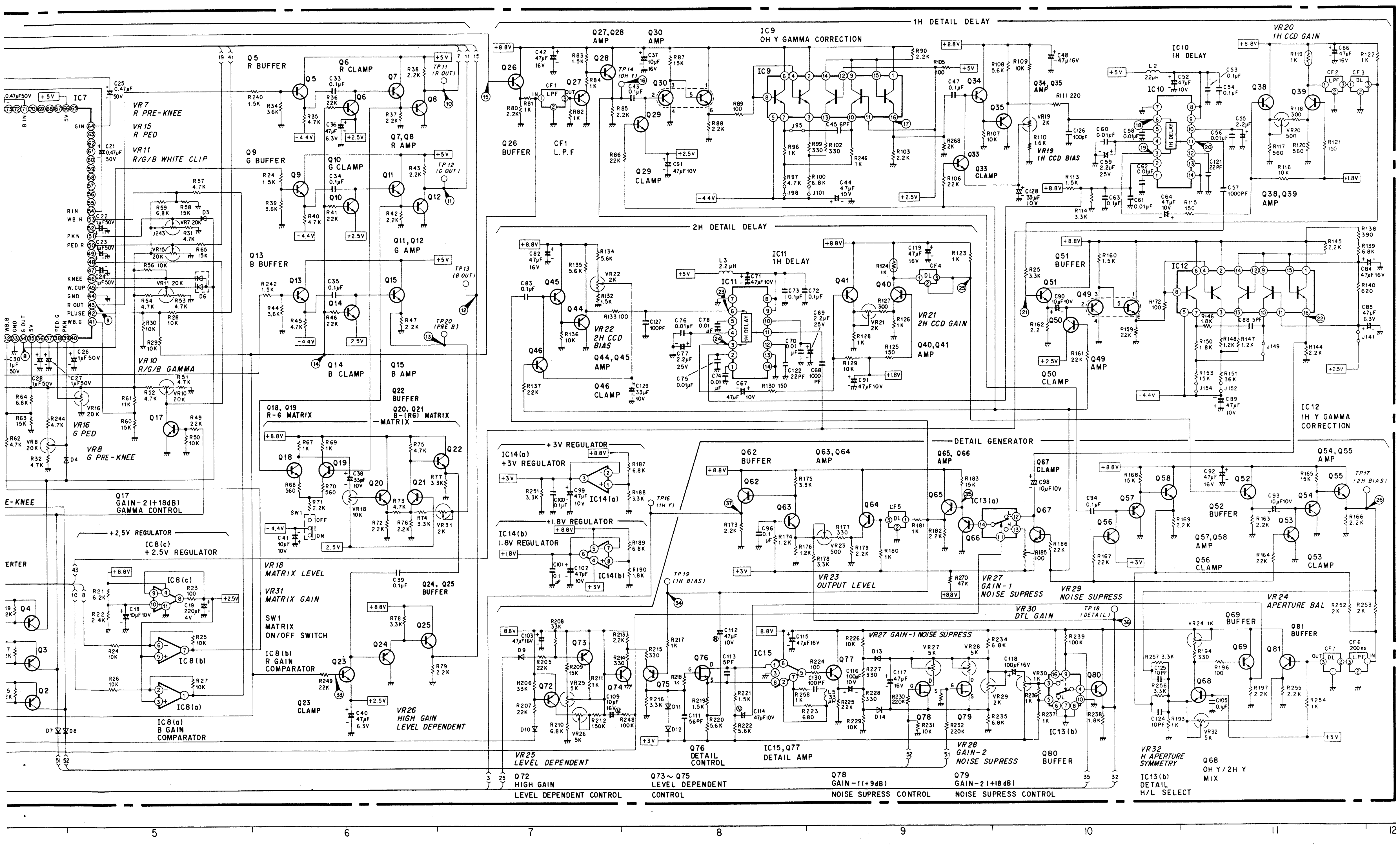

36. 50mV/DIV,10μsec/DIV


37. 0.2V/DIV, 20μsec/DIV


PROCESS / DETAIL BOARD
R. G. B. PROCESS
CN1
To MOTHER BOARD --- CN2
IC1
IC2
IC3
OPTICAL BLACK CLAMP
INPUT GAIN / PULSE CANCEL
BUFFER
HIGH GAIN CONTROL
(-6dB GAIN)
(+9dB GAIN)
(+18dB GAIN)
VR2 R INPUT GAIN
VR1 R PUL CAN
VR4 G INPUT GAIN
VR3 G PUL CAN
VR6 B INPUT GAIN
VR5 B PUL CAN
IC7
VR7 R PRE-KNEE
VR15 R PED
VR11 R/G/B WHITE CL
VR10 R/G/B GAMMA
VR16 G PED
VR8 G PRE-KNEE
VR17 B PED
VR9 B PRE-KNEE
Q17 GAIN-2 (+18dB) GAMMA CONTROL
Q4 INVERTER
+2.5V REGULATOR
IC8(c) +2.5V REGUL
IC4(b), (c) OBCP LEVEL CONVERTER
IC6(a), Q1 -4.4V REGULATOR
IC4(a), Q82~Q84 -6dB GAIN ON/OFF CONT
IC5(e) PRE-BL(+5V) LEVEL CHANGE INVERTER
IC5(f) PRE-BL(+9V) LEVEL CHANGE INVERTER
IC5(a), (b), (c), (d) CP COMPENSATOR
Q2 GAIN-1 (+9dB) ON/OFF DETECT
Q3 GAIN-2 (+18dB) ON/OFF DETECT
IC8(a) B GAIN COMPARATO
TP10 (GROUND)
A
B
C
D
E
1
2
3
4
5

RAM OF PROCESS/DETAIL BOARD


1H DETAIL DELAY
2H DETAIL DELAY
DETAIL GENERATOR
Q5 R BUFFER
Q6 R CLAMP
Q7, Q8 R AMP
Q9 G BUFFER
Q10 G CLAMP
Q11, Q12 G AMP
Q13 B BUFFER
Q14 B CLAMP
Q15 B AMP
Q17 GAIN-2 (+18dB) GAMMA CONTROL
Q18, Q19 R-G MATRIX
Q20, Q21 B-(RG) MATRIX
Q22 BUFFER
Q23 CLAMP
Q24, Q25 BUFFER
Q26 BUFFER
CF1 L.P.F
Q27, Q28 AMP
Q29 CLAMP
Q30 AMP
IC9 OH Y GAMMA CORRECTION
IC10 1H DELAY
IC11 1H DELAY
IC12 1H Y GAMMA CORRECTION
Q33 CLAMP
Q34, Q35 AMP
Q38, Q39 AMP
Q40, Q41 AMP
Q44, Q45 AMP
Q46 CLAMP
Q49 AMP
Q50 CLAMP
Q51 BUFFER
Q52 BUFFER
Q53 CLAMP
Q54, Q55 AMP
Q56 CLAMP
Q57, Q58 AMP
Q62 BUFFER
Q63, Q64 AMP
Q65, Q66 AMP
Q67 CLAMP
Q68 OH Y/2H Y MIX
Q69 BUFFER
Q72 HIGH GAIN LEVEL DEPENDENT CONTROL
Q73~Q75 LEVEL DEPENDENT CONTROL
Q76 DETAIL CONTROL
IC15, Q77 DETAIL AMP
Q78 GAIN-1 (+9dB) NOISE SUPRESS CONTROL
Q79 GAIN-2 (+18dB) NOISE SUPRESS CONTROL
Q80 BUFFER
Q81 BUFFER
IC13(b) DETAIL H/L SELECT
IC14(a) +3V REGULATOR
IC14(b) 1.8V REGULATOR
IC8(c) +2.5V REGULATOR
IC8(b) R GAIN COMPARATOR
IC8(a) B GAIN COMPARATOR
VR7 R PRE-KNEE
VR15 R PED
VR11 R/G/B WHITE CLIP
VR10 R/G/B GAMMA
VR16 G PED
VR8 G PRE-KNEE
VR18 MATRIX LEVEL
VR31 MATRIX GAIN
SW1 MATRIX ON/OFF SWITCH
VR26 HIGH GAIN LEVEL DEPENDENT
VR25 LEVEL DEPENDENT
VR19 1H CCD BIAS
VR20 1H CCD GAIN
VR21 2H CCD GAIN
VR22 2H CCD BIAS
VR23 OUTPUT LEVEL
VR24 APERTURE BAL
VR27 GAIN-1 NOISE SUPRESS
VR28 GAIN-2 NOISE SUPRESS
VR29 NOISE SUPRESS
VR30 DTL GAIN
VR32 H APERTURE SYMMETRY
TP11 (R OUT)
TP12 (G OUT)
TP13 (B OUT)
TP14 (OH Y)
TP16 (1H Y)
TP17 (2H BIAS)
TP18 (DETAIL)
TP19 (1H BIAS)
TP20 (PRE B)
5
6
7
8
9
10
11
12

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IC1	D3
IC2	C3
IC3	B3
IC4	B2
IC5	A3, B3
IC6	A2
IC7	D4
IC8	A5, B5
IC9	D9
IC10	D10
IC11	C8
IC12	C11
IC13	A10, B10
IC14	B7
IC15	A8
Q1	A2
Q2	A4
Q3	A4
Q4	B4
Q5	D6
Q6	D6
Q7	D6
Q8	D6
Q9	D6
Q10	D6
Q11	D6
Q12	D6
Q13	C6
Q14	C6
Q15	C6
Q17	C5
Q18	B6
Q19	B6
Q20	B6
Q21	B6
Q22	B7
Q23	A6
Q24	A6
Q25	A6
Q26	D7
Q27	D7
Q28	E7
Q29	D8
Q30	D8
Q33	D9
Q34	D9
Q35	D10
Q38	D11
Q39	C3
Q40	C2
Q41	C2
Q44	C7
Q45	C7
Q46	C7
Q49	C10
Q50	C10
Q51	C10
Q52	B11
Q53	B11
Q54	B11
Q55	B11
Q56	B10
Q57	B10
Q58	B10
Q62	B8
Q63	B8
Q64	B9
Q65	B9
Q66	B9
Q67	B10
Q68	A11
Q69	A11
Q72	A7
Q73	A7
Q74	A8
Q75	A8
Q76	A8
Q77	A9
Q78	A9
Q79	A9
Q80	A10
Q81	A11
Q82	B4
Q83	B4
Q84	B4
D2	A4
D3	D5
D4	B5
D5	B4
D6	C5
D7	A4
D8	A4
D9	A7
D10	A7
D11	A8
D12	A8
D13	A9
D14	A9
D15	B4

CONDUCTOR VIEW OF PROCESS/DETAIL BOARD

<Voltages>

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1	0.5	8.8	-0.1	-0.1	1.8	0.2	0	0	8.8	-4.2	0	-1.1	-5.1	0.6	5.3	
IC2	0.5	8.8	-0.1	-0.1	1.8	0.2	0	0	8.8	-4.2	0.1	-1.1	-5.1	0.6	5.3	
IC3	0.5	8.8	-0.1	-0.1	1.8	0.2	0	0	8.8	-4.2	0.1	-1.1	-5.1	0.6	5.3	
IC4	8.8	8.8	0.8	8.6	3.4	3.4	0	8.6	8.6	0.2	8.8	0	0	8.8		
IC5	8.8	0.2	8.5	0.2	8.5	0.2	8.5	0	0.3	8.5	3.5	6.7	0	6.7	1.8	0
IC6	-6.9	-4.2	-4.2	-8.3	0	0	-8.3	8.8								
IC8	2.4	2.5	2.5	8.8	2.5	2.5	2.4	2.4	2.5	2.5	0	0	0	0		
IC9	8.8	8.8	1.9	2.5	-4.2	8.8	1.8	2.5	7.5	1.8	2.5	2.5	1.9	7.5	7.5	6.8
IC10	-2.5	6.1	1.3	2.1	2.0	2.5	0	5.0	5.0	3.8	1.5	1.1	0	0		
IC11	-2.8	6.1	1.4	2.1	2.0	2.5	0	5.0	5.0	3.8	1.5	1.2	0	0		
IC12	8.8	8.8	2.1	2.5	-4.2	8.8	1.9	2.5	8.0	1.8	2.5	3.0	2.3	8.0	8.0	7.2
IC13	0.3	0.3	2.9	2.9	2.9	0	0	0	8.7	0	1.8	2.9	2.9	2.9	1.5	8.8
IC14	2.9	2.9	2.9	0	1.8	1.8	1.8	8.8								
IC15	2.8	2.1	0	6.5	6.6	8.8	2.1	2.8								

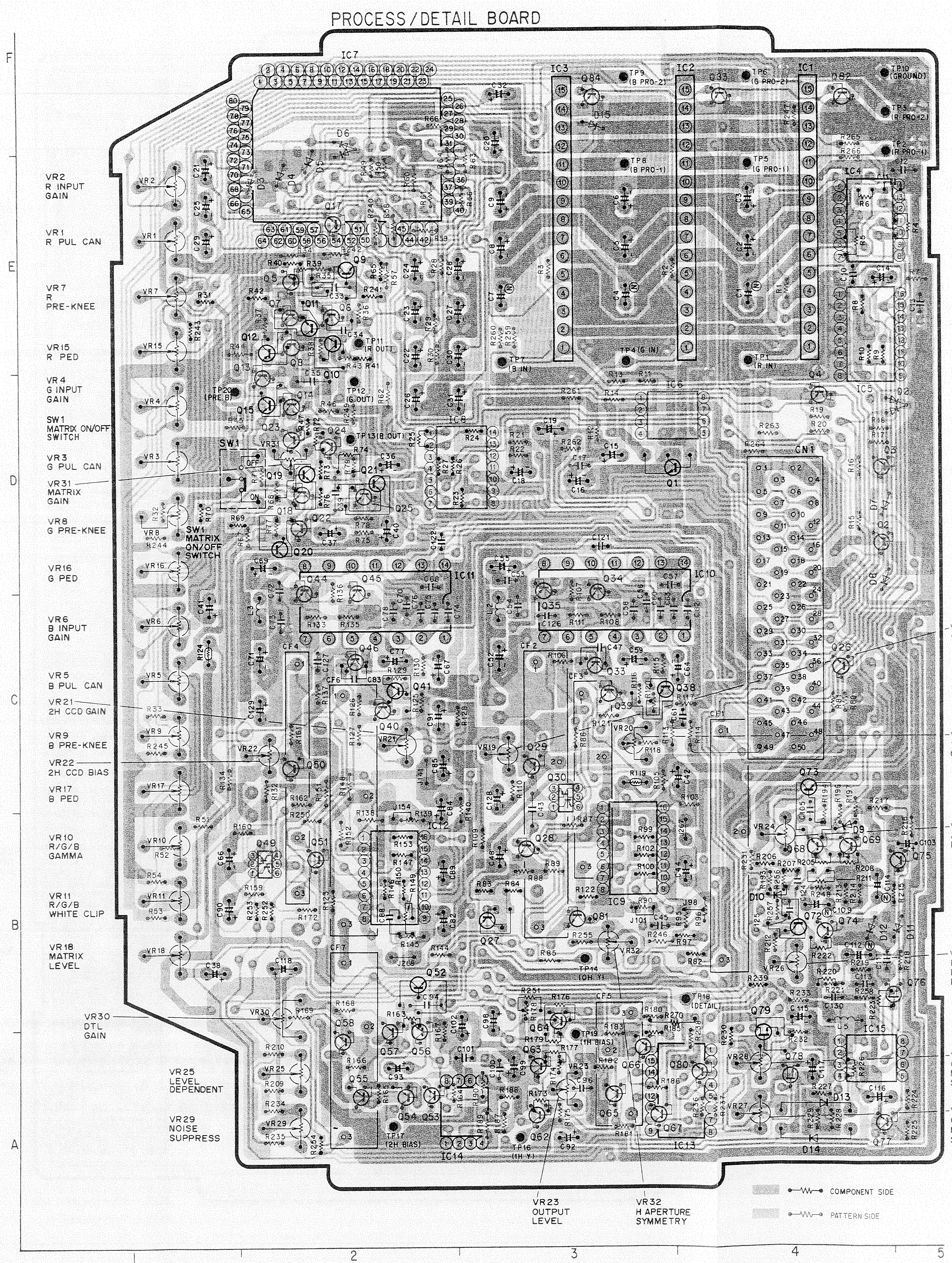
	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Pin21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	—	—	—	—	2.0	1.2	1.3	0	2.5	4.1	1.2	2.9	0	1.9	5.0	1.1	1.2	2.5	4.1	1.2
	Pin41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	2.9	0.9	1.9	0	2.9	5.0	1.1	2.9	1.2	2.5	4.1	1.2	2.9	2.9	—	—	—	—	—	—
	Pin61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	2.8	—	—	—	—	5.0	—	—	—	—	2.8	—	—	—	—	—	—	—	—	—

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
B	-7.7	8.9	8.8	5.0	1.2	0.2	2.6	2.0	1.1	0.2	2.5	1.9	1.2	0.2	2.5	0.3	2.0	1.9	2.4	2.5	5.0	0.2	2.6
C	-4.2	-5.1	-1.1	0.5	5.0	2.6	5.0	0	5.0	2.5	5.0	0	5.0	2.6	5.0	2.9	7.7	7.7	8.8	5.0	8.8	2.6	0
E	-8.3	8.8	8.8	5.0	0.6	2.5	2.0	2.6	0.5	2.5	1.9	2.5	0.6	2.5	1.9	0	1.4	1.3	1.9	1.9	4.4	2.5	3.2

	Q25	Q26	Q27	Q28	Q29	Q33	Q34	Q35	Q38	Q39	Q40	Q41	Q44	Q45	Q46	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57
B	3.2	2.6	1.1	4.5	0.2	0.2	2.5	2.0	1.8	1.8	1.8	1.8	1.9	2.5	0.2	0.2	7.9	8.3	0.2	2.9	3.5	0.2	2.9
C	8.8	8.8	0	0	2.5	2.5	8.8	0	8.8	7.8	8.3	8.8	0	8.8	2.5	2.5	7.2	8.8	2.9	0	8.8	2.9	0
E	2.6	2.0	1.7	3.9	2.5	2.4	2.0	2.6	0	1.1	1.1	1.2	2.6	1.9	2.5	2.5	8.8	7.7	2.9	3.5	2.9	0	3.5

	Q58	Q62	Q63	Q64	Q65	Q66	Q67	Q68	Q69	Q72	Q73	Q74	Q75	Q76	Q77	Q78	Q79	Q80	Q81	Q82	Q83	Q84	
B	3.5	3.9	2.9	2.9	3.5	2.9	0.2	2.9	7.7	8.8	8.8	2.7	2.9	2.8	6.6	3.9	3.9	2.9	2.9	6.8	6.8	6.8	
C	8.8	8.8	3.9	8.8	8.8	0	2.9	7.7	8.8	2.6	2.7	0	2.5	2.5	8.8	0	0	8.8	8.8	0	0	0	
E	2.9	3.3	2.1	2.3	2.9	3.5	2.9	3.2	7.1	0	8.8	3.3	3.5	2.8	5.9	4.8	4.8	2.3	2.3	5.3	5.3	5.3	

	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
Q30	8.8	2.5	3.1	0	3.1	2.5
Q49	8.8	2.5	3.1	0	3.1	2.5


PROCESS/DETAIL BOARD
F
E
D
C
B
A
1
2
3
4
5
VR2 R INPUT GAIN
VR1 R PUL CAN
VR7 R PRE-KNEE
VR15 R PED
VR4 G INPUT GAIN
SW1 MATRIX ON/OFF SWITCH
VR3 G PUL CAN
VR31 MATRIX GAIN
VR8 G PRE-KNEE
VR16 G PED
VR6 B INPUT GAIN
VR5 B PUL CAN
VR21 2H CCD GAIN
VR9 B PRE-KNEE
VR22 2H CCD BIAS
VR17 B PED
VR10 R/G/B GAMMA
VR11 R/G/B WHITE CLIP
VR18 MATRIX LEVEL
VR30 DTL GAIN
VR25 LEVEL DEPENDENT
VR29 NOISE SUPPRESS
VR23 OUTPUT LEVEL
VR32 H APERTURE SYMMETRY
VR19 1H CCD BIAS
VR20 1H CCD GAIN
VR24 APERTURE BAL
VR26 HIGH GAIN LEVEL DEPENDENT
VR28 GAIN-2 NOISE SUPRESS
VR27 GAIN-1 NOISE SUPRESS
COMPONENT SIDE
PATTERN SIDE

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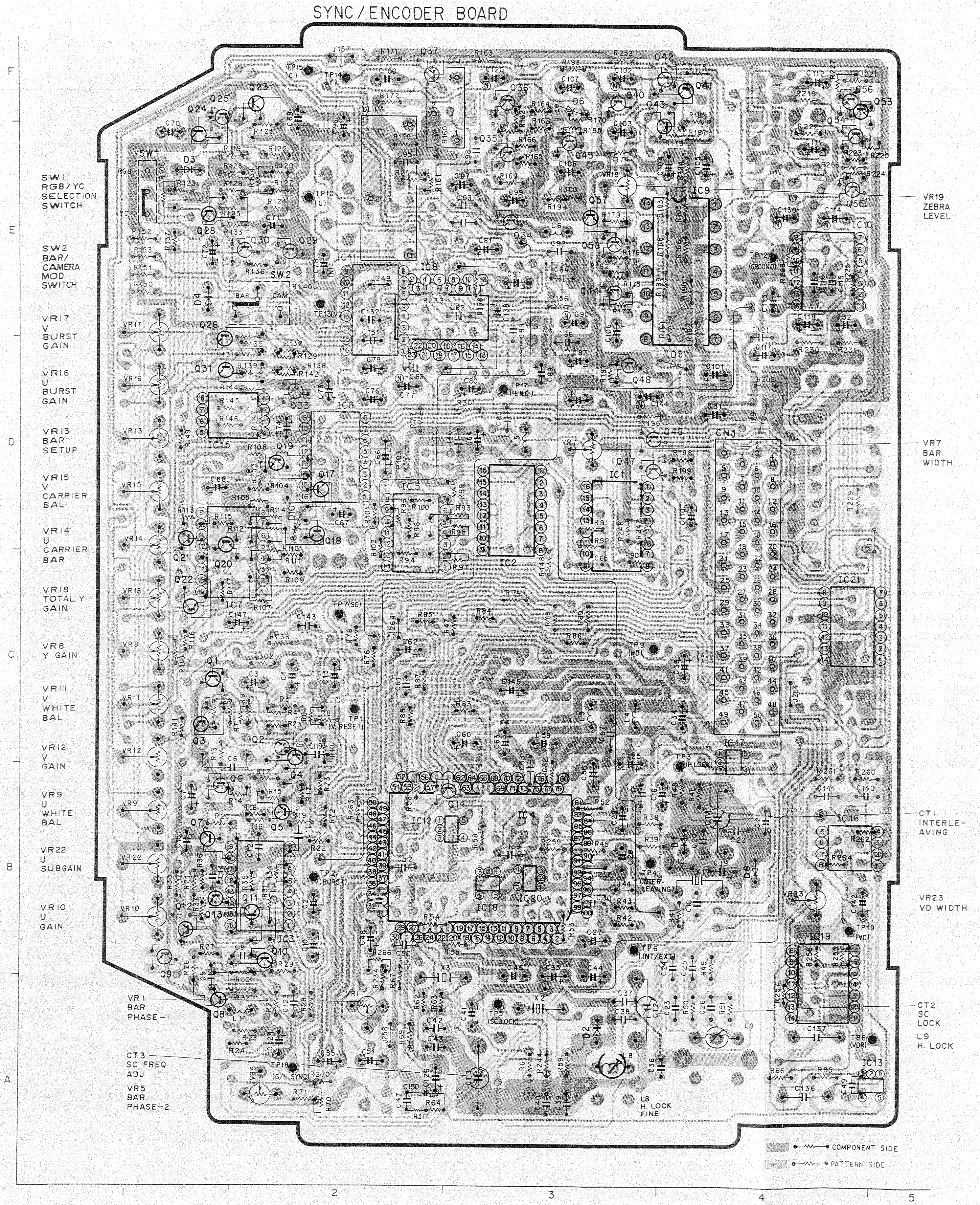
IC1	F4
IC2	F4
IC3	F3
IC4	E4
IC5	D4
IC6	D3
IC7	F2
IC8	D2
IC9	B3
IC10	D3
IC11	D2
IC12	B2
IC13	A3
IC14	A2
IC15	A4
Q1	D3
Q2	D4
Q3	D4
Q4	D4
Q5	E2
Q6	E2
Q7	E2
Q8	E2
Q9	E2
Q10	E2
Q11	E2
Q12	E2
Q13	D2
Q14	D2
Q15	D2
Q17	E2
Q18	D2
Q19	D2
Q20	D2
Q21	D2
Q22	D2
Q23	D2
Q24	D2
Q25	D2
Q26	C4
Q27	B3
Q28	B3
Q29	C3
Q30	C3
Q33	C3
Q34	D3
Q35	C3
Q38	C3
Q39	C3
Q40	C2
Q41	C2
Q44	D2
Q45	D2
Q46	C2
Q49	B2
Q50	C2
Q51	B2
Q52	B2
Q53	A2
Q54	A2
Q55	A2
Q56	A2
Q57	A2
Q58	A2
Q62	A3
Q63	A3
Q64	A3
Q65	A3
Q66	A3
Q67	A3
Q68	B4
Q69	B4
Q72	B4
Q73	C4
Q74	B4
Q75	B5
Q76	B5
Q77	A4
Q78	A4
Q79	B4
Q80	A4
Q81	B3
Q82	F4
Q83	F4
Q84	F4
D2	D5
D3	E2
D4	E2
D5	E2
D6	F2
D7	D4
D8	D4
D9	B4
D10	B4
D11	B5
D12	B4
D13	A4
D14	A4
D15	F3

CONDUCTOR VIEW OF SYNC/ENCODER BOARD

<Index>

IC1	D3
IC2	D3
IC3	B2
IC4	B3
IC5	D2
IC6	D2
IC7	C1
IC8	E2
IC9	E4
IC10	E4
IC11	E2
IC12	B2
IC13	A4
IC15	D1
IC16	B4
IC17	C4
IC18	B3
IC19	B4
IC20	B3
IC21	C4
Q1	C1
Q2	C2
Q3	C1
Q4	B2
Q5	B2
Q6	B1
Q7	B1
Q8	A1
Q9	B1
Q10	B2
Q11	B2
Q12	B1
Q13	B1
Q14	B3
Q17	D2
Q18	D2
Q19	D2
Q20	D1
Q21	D1
Q22	C1
Q23	F2
Q24	E1
Q25	F1
Q26	E1
Q28	E1
Q29	E2
Q30	E2
Q31	D1
Q33	D2
Q34	E3
Q35	E3
Q36	F3
Q37	F2
Q40	F3
Q41	F4
Q42	F4
Q43	F4
Q44	E3
Q45	E3
Q46	D4
Q47	D3
Q48	D3
Q53	F4
Q54	F4
Q55	E4
Q57	E3
Q58	E3
D1	B4
D2	A3
D3	E1
D4	E1
D5	D3
D6	F3
D8	B4
D9	D4
D10	D2


SYNC/ENCODER BOARD
F
E
D
C
B
A
1
2
3
4
5
SW1 RGB/YC SELECTION SWITCH
SW2 BAR/CAMERA MOD SWITCH
VR17 V BURST GAIN
VR16 U BURST GAIN
VR13 BAR SETUP
VR15 V CARRIER BAL
VR14 U CARRIER BAR
VR18 TOTAL Y GAIN
VR8 Y GAIN
VR11 V WHITE BAL
VR12 V GAIN
VR9 U WHITE BAL
VR22 U SUBGAIN
VR10 U GAIN
VR1 BAR PHASE-1
CT3 SC FREQ ADJ
VR5 BAR PHASE-2
L8 H. LOCK FINE
VR19 ZEBRA LEVEL
VR7 BAR WIDTH
CT1 INTERLE-AVING
VR23 VD WIDTH
CT2 SC LOCK
L9 H. LOCK
TP1 (V RESET)
TP2 (BURST)
TP3 (H.LOCK)
TP4 (INTER-LEAVING)
TP5 (SC LOCK)
TP6 (INT/EXT)
TP7 (SC)
TP8 (VDR)
TP9 (HD)
TP10 (U)
TP12 (GROUND)
TP13 (V)
TP15 (C)
TP16 (Y)
TP17 (ENC)
TP18 (G/L SYNC)
TP19 (VD)
COMPONENT SIDE
PATTERN SIDE

<Voltages>

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
IC1	0	5.0	5.0	0	5.0	0	1.1	5.0	5.0	0	5.0	0	0	4.3	1.1	0								
IC2	1.1	—	0	0	0	0	0	4.3	0	0	0	0	0	0	0	1.1								
IC3	5.0	0	5.0	3.7	1.3	4.6	0.4	0	0.1	5.0	0	5.0	0	5.0	0	0								
IC5	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0										
IC6	2.6	2.0	2.6	2.6	2.0	0	0	0	8.6	8.6	8.6	2.0	2.6	2.6	2.6	8.8								
IC7	4.7	5.9	1.9	1.9	1.5	0	0	0	8.7	8.6	0	0	0.3	0	4.7	8.8								
IC8	2.3	1.7	2.9	3.0	3.6	0	3.2	4.9	3.7	4.6	2.7	2.0	2.6	3.0	3.0	1.8	1.8	5.0	3.0	0	3.0	2.9	1.8	2.4
IC9	0	0	5.0	5.0	2.1	2.6	0	0.4	3.3	2.9	0	2.2.	4.3	0										
IC10	1.7	0	1.8	2.4	0	2.4	0	1.8	2.1	1.8	0.8	0.1	2.1	5.0										
IC11	5.0	5.0	0	4.9	0.2	2.5	2.5	0	0	5.0	0.2	4.8	0	8.6	0	0								
IC12	5.0	9.9	0	2.8	5.0																			
IC13	3.4	3.4	0	0.3	8.8																			
IC15	2.5	3.2	3.2	0	0	0	0	8.8																
IC16	0	3.6	3.6	0	3.5	3.5	3.9	8.8																
IC17	5.0	0	0	0	5.0																			
IC18	0	0	0	5.0	2.7																			
IC19	0	4.9	0.1	0.1	4.9	4.9	0	0.1	0.7	4.9	4.9	0.1	0.1	5.0										
IC20	0	2.5	0	5.0	2.7																			
IC21	5.0	0.1	3.0	5.0	0.1	4.8	0	5.0	5.0	0	0	0	0	5.0										

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC4	5.0	5.0	5.0	5.0	0	5.0	0	5.0	0	5.0	5.0	5.0	5.0	0	-3.6	-3.6	-3.6	-3.6	-3.7	0
	Pin21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	5.0	0	4.7	5.0	2.6	17.3	0	5.0	1.1	0	5.0	1.8	0	5.0	1.7	0	5.0	1.9	0	5.0
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	4.9	4.9	0	0	-1.4	-1.4	2.5	0.2	0	0.3	2.1	0	5.0	0.6	—	1.8	0	0.2	0.1	0.4
	Pin61	62	63	4	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	0.2	0.1	0.5	0	5.0	0	5.0	5.0	5.0	0	0.4	0	0.2	0	1.8	—	0.6	5.0	0	2.2
	Pin81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
	0.1	0	0.2	2.5	-1.8	-2.3	0	0	5.0	5.0	5.0	0	1.2	5.0	0	1.1	5.0	0	1.0	5.0

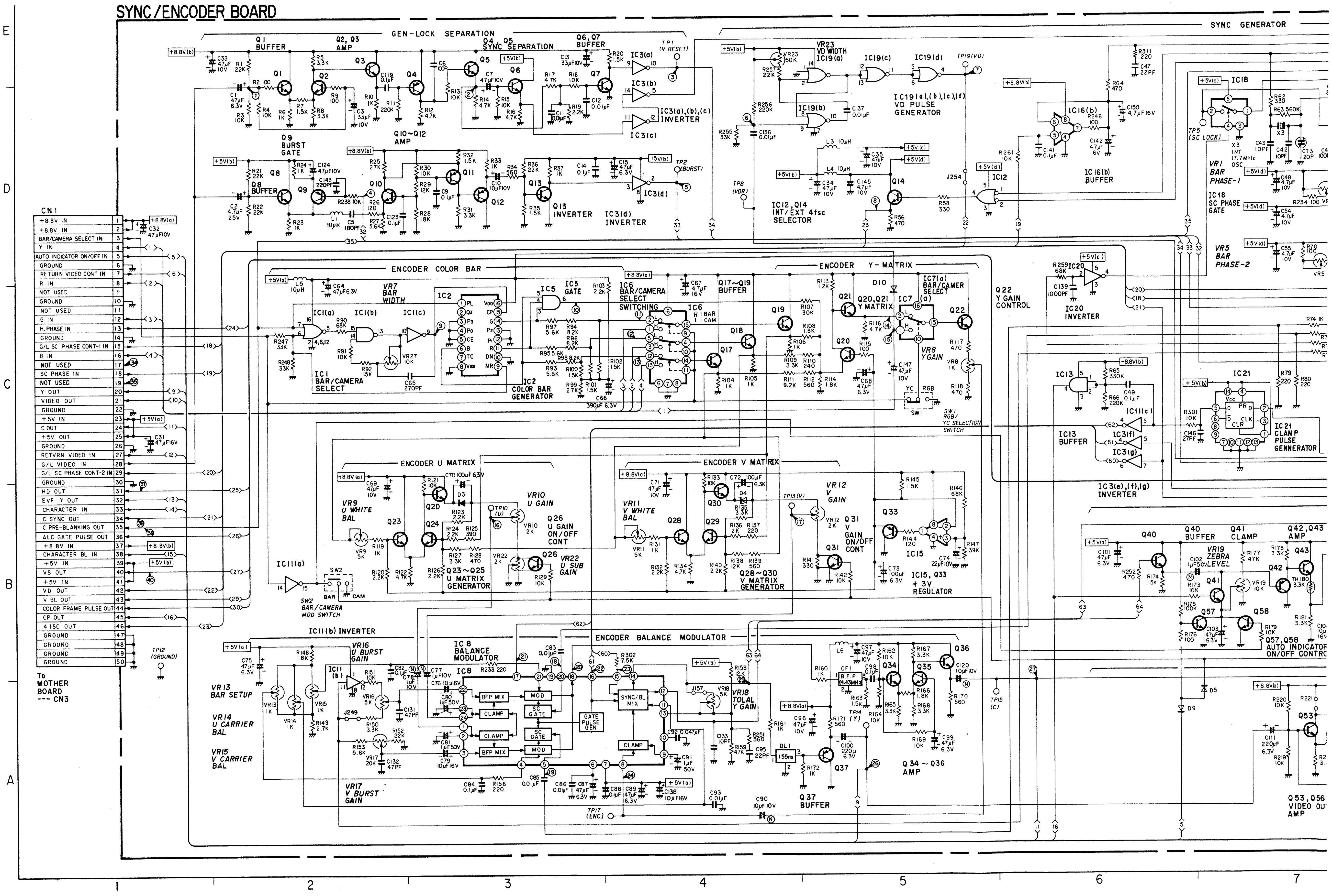
	Q28	Q29	Q30	Q31	Q33	Q34	Q35	Q36	Q37	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q50	Q53	Q54	Q55	Q57	Q58
B	2.7	2.7	7.0	0	2.5	4.3	4.2	5.2	1.3	2.5	0.1	0.8	1.4	1.1	2.5	2.5	2.2	1.8	8.3	4.4	4.3	5.6	0.5	0
C	8.8	0	8.8	0.4	0	8.8	5.2	8.8	0	5.0	0.9	0	5.0	5.0	5.0	5.0	5.0	0	0	8.8	5.6	8.8	0.6	0.6
E	2.1	2.1	6.4	0	3.2	3.6	3.5	4.4	1.9	1.8	0.6	1.4	0.8	0.5	1.9	1.9	1.5	2.5	8.8	3.7	3.5	4.9	0	0

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26
B	2.8	2.7	6.6	8.1	8.6	0	0.7	2.5	1.8	3.9	6.6	2.7	0.3	2.3	0.5	2.7	2.7	3.2	6.7	4.8	2.8	2.7	0	0
C	8.8	6.6	8.8	8.7	8.8	5.0	0.1	5.0	2.4	7.2	3.5	8.8	5.0	5.0	8.8	8.8	8.8	6.7	8.8	8.8	8.8	7.4	8.8	0.3
E	2.1	2.1	6.0	8.8	8.0	0	0	2.4	2.5	3.2	7.2	2.1	0	2.9	2.1	2.1	2.1	2.5	6.1	4.2	2.2	2.2	6.6	0

SCHEMATIC DIAGRAM OF SYNC/EN

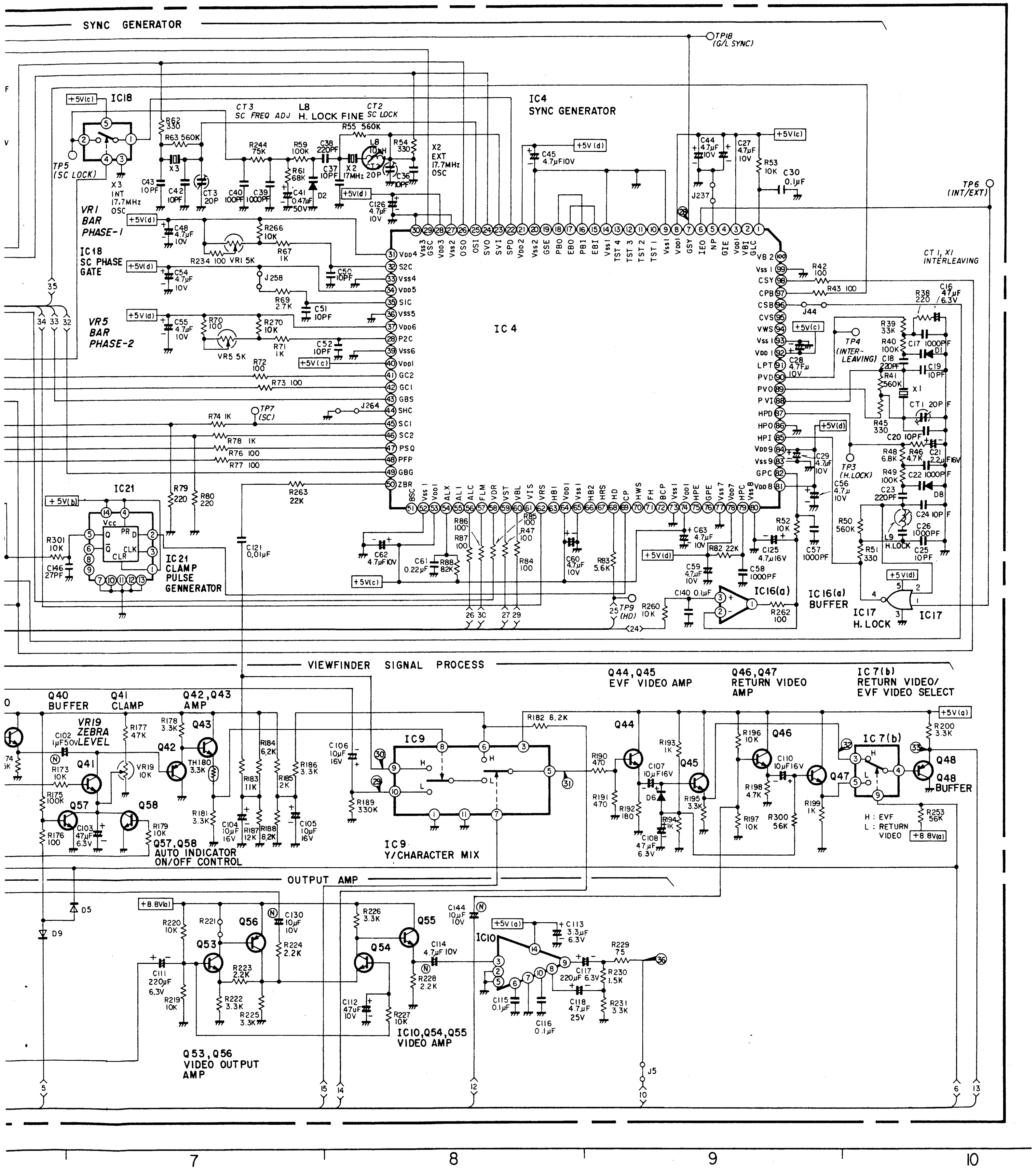
<Index>

IC1	C2, C3
IC2	C3
IC3	C6, D4, E4
IC4	D8
IC5	C3
IC6	C4
IC7	C5, B10
IC8	A3
IC9	D8
IC10	A8
IC11	A2, B2, C6
IC12	D5
IC13	C6
IC15	B5
IC16	C9, D6
IC17	C10
IC18	D7
IC19	D5, E5
IC20	A6
IC21	C7
Q1	E2
Q2	E2
Q3	E2
Q4	E3
Q5	E3
Q6	E3
Q7	E4
Q8	D2
Q9	D2
Q10	D2
Q11	D3
Q12	D3
Q13	D3
Q14	D5
Q17	C4
Q18	C4
Q19	C4
Q20	C5
Q21	C5
Q22	C5
Q23	B2
Q24	B3
Q25	B3
Q26	B3
Q28	B4
Q29	B4
Q30	B4
Q31	B5
Q33	B5
Q34	A5
Q35	A5
Q36	B5
Q37	A5
Q40	B6
Q41	B7
Q42	B7
Q43	B7
Q44	B9
Q45	B9
Q46	B9
Q47	B9
Q48	B10
Q53	A7
Q54	A8
Q55	A8
Q57	B7
Q58	B7
D1	D10
D2	D7
D3	B3
D4	B4
D5	A7
D6	B9
D8	C10
D9	A6
D10	C5

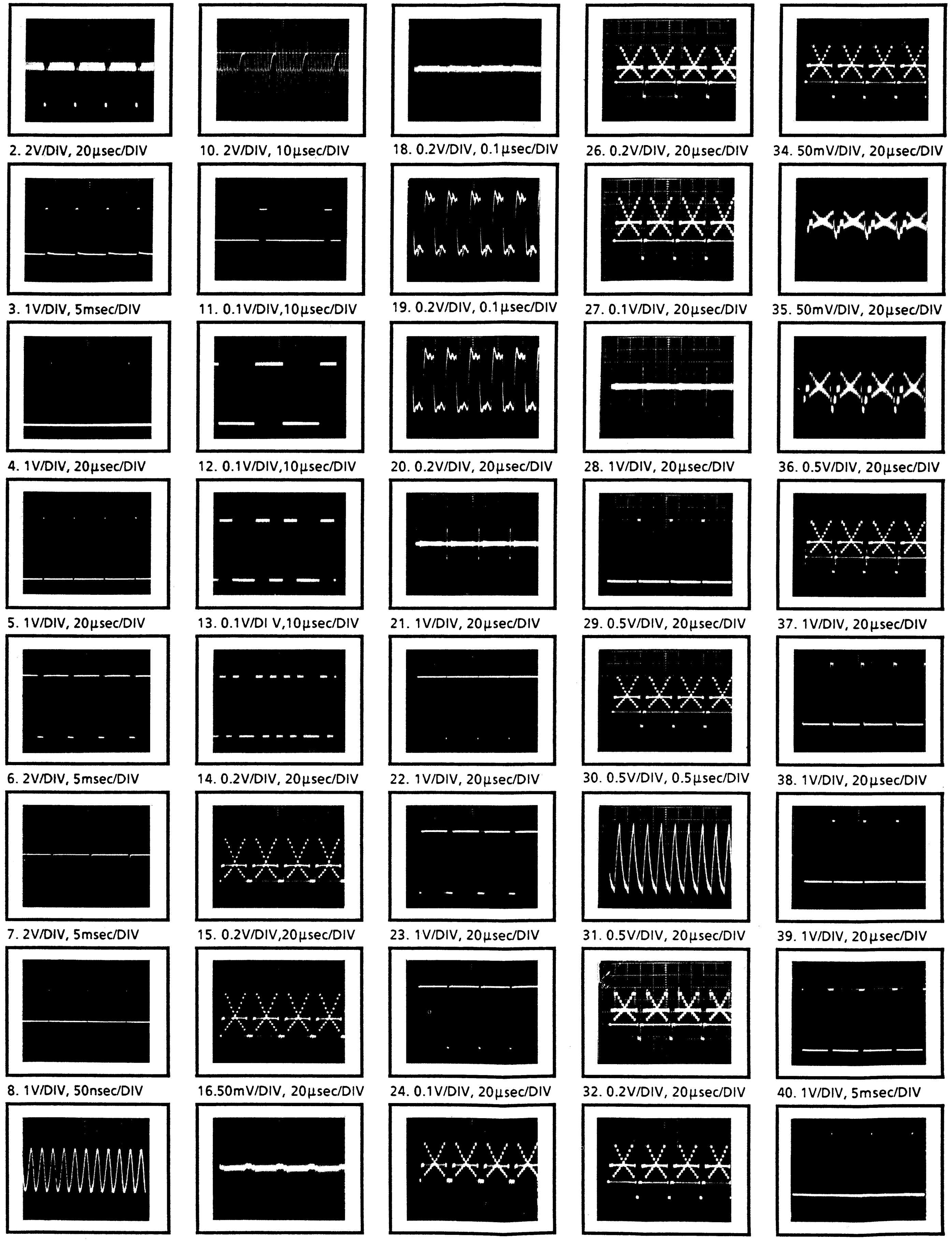


SYNC/ENCODER BOARD
E
D
C
B
A
1
2
3
4
5
6
7
GEN-LOCK SEPARATION
Q1 BUFFER
Q2, Q3 AMP
Q4, Q5 SYNC SEPARATION
Q6, Q7 BUFFER
IC3(a),(b),(c) INVERTER
TP1 (V. RESET)
Q9 BURST GATE
Q8 BUFFER
Q10~Q12 AMP
Q13 INVERTER
IC3(d) INVERTER
TP2 (BURST)
SYNC GENERATOR
VR23 VD WIDTH
IC19(a)
IC19(b)
IC19(c)
IC19(d)
TP19 (VD)
IC19(a),(b),(c),(d) VD PULSE GENERATOR
TP8 (VDR)
IC12, Q14 INT/EXT 4fsc SELECTOR
IC12
IC16(b) BUFFER
IC18
TP5 (SC LOCK)
X3 INT 17.7MHz OSC
VR1 BAR PHASE-1
IC18 SC PHASE GATE
VR5 BAR PHASE-2
CN1
+8.8V IN 1
+8.8V IN 2
BAR/CAMERA SELECT IN 3
Y IN 4
AUTO INDICATOR ON/OFF IN 5
GROUND 6
RETURN VIDEO CONT IN 7
R IN 8
NOT USED 9
GROUND 10
NOT USED 11
G IN 12
H. PHASE IN 13
GROUND 14
G/L SC PHASE CONT-1 IN 15
B IN 16
NOT USED 17
SC PHASE IN 18
NOT USED 19
Y OUT 20
VIDEO OUT 21
GROUND 22
+5V IN 23
C OUT 24
+5V OUT 25
GROUND 26
RETVRN VIDEO IN 27
G/L VIDEO IN 28
G/L SC PHASE CONT-2 IN 29
GROUND 30
HD OUT 31
EVF Y OUT 32
CHARACTER IN 33
C SYNC OUT 34
C PRE-BLANKING OUT 35
ALC GATE PULSE OUT 36
+8.8V IN 37
CHARACTER BL IN 38
+5V IN 39
VS OUT 40
+5V IN 41
VD OUT 42
V BL OUT 43
COLOR FRAME PULSE OUT 44
CP OUT 45
4 fSC OUT 46
GROUND 47
GROUND 48
GROUND 49
GROUND 50
To MOTHER BOARD --- CN3
TP12 (GROUND)
ENCODER COLOR BAR
VR7 BAR WIDTH
IC1 BAR/CAMERA SELECT
IC2 COLOR BAR GENERATOR
IC5 GATE
IC6 BAR/CAMERA SELECT SWITCHING
H: BAR L: CAM
Q17~Q19 BUFFER
ENCODER Y-MATRIX
Q20, Q21 Y MATRIX
D10
IC7(a) BAR/CAMER SELECT
VR8 Y GAIN
SW1 RGB/YC SELECTION SWITCH
Q22 Y GAIN CONTROL
IC20 INVERTER
IC13 BUFFER
IC21 CLAMP PULSE GENNERATOR
IC3(e),(f),(g) INVERTER
ENCODER U MATRIX
VR9 U WHITE BAL
TP10 (U)
VR10 U GAIN
Q26 U GAIN ON/OFF CONT
VR22 U SUB GAIN
Q23~Q25 U MATRIX GENERATOR
ENCODER V MATRIX
VR11 V WHITE BAL
TP13 (V)
VR12 V GAIN
Q31 V GAIN ON/OFF CONT
Q28~Q30 V MATRIX GENERATOR
IC15, Q33 +3V REGULATOR
IC11(a)
SW2 BAR/CAMERA MOD SWITCH
BAR CAM
Q40 BUFFER
Q41 CLAMP
Q42, Q43 AMP
VR19 ZEBRA LEVEL
Q57, Q58 AUTO INDICATOR ON/OFF CONTRO
IC11(b) INVERTER
ENCODER BALANCE MODULATOR
VR16 U BURST GAIN
VR13 BAR SETUP
VR14 U CARRIER BAL
VR15 V CARRIER BAL
VR17 V BURST GAIN
IC8 BALANCE MODULATOR
BFP MIX
CLAMP
MOD
SC GATE
GATE PULSE GEN
SYNC/BL MIX
VR18 TOTAL Y GAIN
DL1 155ns
Q37 BUFFER
TP17 (ENC)
B.F.P 4.43MHz
Q34~Q36 AMP
TP15 (C)
TP14 (Y)
Q53, Q56 VIDEO OUT AMP

AM OF SYNC/ENCODER BOARD


SYNC GENERATOR
TP18 (G/L SYNC)
IC18
CT3 SC FREQ ADJ
L8 H. LOCK FINE
CT2 SC LOCK
IC4 SYNC GENERATOR
X2 EXT 17.7MHz OSC
X3 INT 17.7MHz OSC
TP5 (SC LOCK)
TP6 (INT/EXT)
VR1 BAR PHASE-1
IC18 SC PHASE GATE
VR5 BAR PHASE-2
IC4
CT1, X1 INTERLEAVING
TP4 (INTER-LEAVING)
TP3 (H.LOCK)
TP7 (SC)
TP9 (HD)
IC21 CLAMP PULSE GENNERATOR
IC16(a) BUFFER
IC17 H. LOCK
VIEWFINDER SIGNAL PROCESS
Q40 BUFFER
Q41 CLAMP
Q42,Q43 AMP
VR19 ZEBRA LEVEL
Q57,Q58 AUTO INDICATOR ON/OFF CONTROL
IC9 Y/CHARACTER MIX
Q44,Q45 EVF VIDEO AMP
Q46,Q47 RETURN VIDEO AMP
IC7(b) RETURN VIDEO/ EVF VIDEO SELECT
H : EVF
L : RETURN VIDEO
Q48 BUFFER
OUTPUT AMP
Q53,Q56 VIDEO OUTPUT AMP
IC10,Q54,Q55 VIDEO AMP
7
8
9
10

<Waveforms>



1. 0.1V/DIV, 20μsec/DIV
2. 2V/DIV, 20μsec/DIV
3. 1V/DIV, 5msec/DIV
4. 1V/DIV, 20μsec/DIV
5. 1V/DIV, 20μsec/DIV
6. 2V/DIV, 5msec/DIV
7. 2V/DIV, 5msec/DIV
8. 1V/DIV, 50nsec/DIV
9. 2V/DIV, 20μsec/DIV
10. 2V/DIV, 10μsec/DIV
11. 0.1V/DIV,10μsec/DIV
12. 0.1V/DIV,10μsec/DIV
13. 0.1V/DI V,10μsec/DIV
14. 0.2V/DIV, 20μsec/DIV
15. 0.2V/DIV,20μsec/DIV
16.50mV/DIV, 20μsec/DIV
17. 50mV/DIV, 20μsec/DIV
18. 0.2V/DIV, 0.1μsec/DIV
19. 0.2V/DIV, 0.1μsec/DIV
20. 0.2V/DIV, 20μsec/DIV
21. 1V/DIV, 20μsec/DIV
22. 1V/DIV, 20μsec/DIV
23. 1V/DIV, 20μsec/DIV
24. 0.1V/DIV, 20μsec/DIV
25. 0.5V/DIV, 20μsec/DIV
26. 0.2V/DIV, 20μsec/DIV
27. 0.1V/DIV, 20μsec/DIV
28. 1V/DIV, 20μsec/DIV
29. 0.5V/DIV, 20μsec/DIV
30. 0.5V/DIV, 0.5μsec/DIV
31. 0.5V/DIV, 20μsec/DIV
32. 0.2V/DIV, 20μsec/DIV
33. 0.2V/DIV, 20μsec/DIV
34. 50mV/DIV, 20μsec/DIV
35. 50mV/DIV, 20μsec/DIV
36. 0.5V/DIV, 20μsec/DIV
37. 1V/DIV, 20μsec/DIV
38. 1V/DIV, 20μsec/DIV
39. 1V/DIV, 20μsec/DIV
40. 1V/DIV, 5msec/DIV

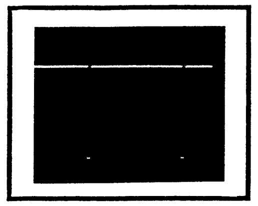
FILM NO. 1 - 5, 28 : GEN-LOCK MODE

FILM NO. 9 - 13 : COLOR BAR MODE

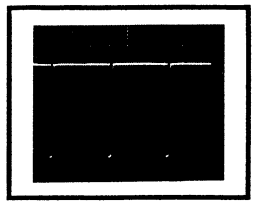
OTHERS : CAMERA MODE

<Waveforms>

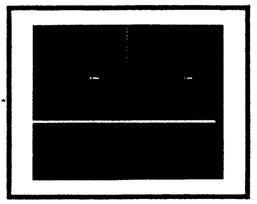
1. 1V/DIV, 10μsec/DIV



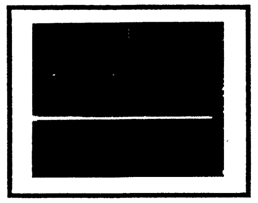
2. 1V/DIV, 5msec/DIV



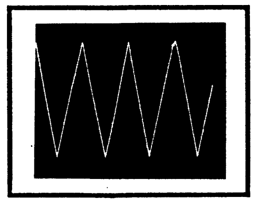
3. 2V/DIV, 10μsec/DIV



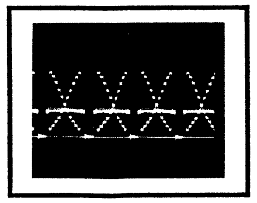
4. 2V/DIV, 5msec/DIV



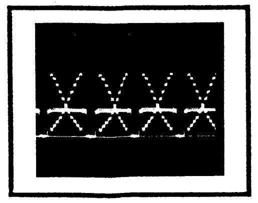
5. 0.1V/DIV, 5μsec/DIV



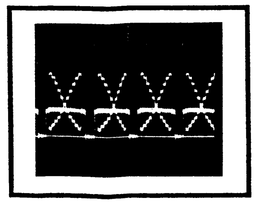
6. 0.2V/DIV, 20μsec/DIV



7. 0.2V/DIV, 20μsec/DIV



8. 0.2V/DIV, 20μsec/DIV



<Voltages>

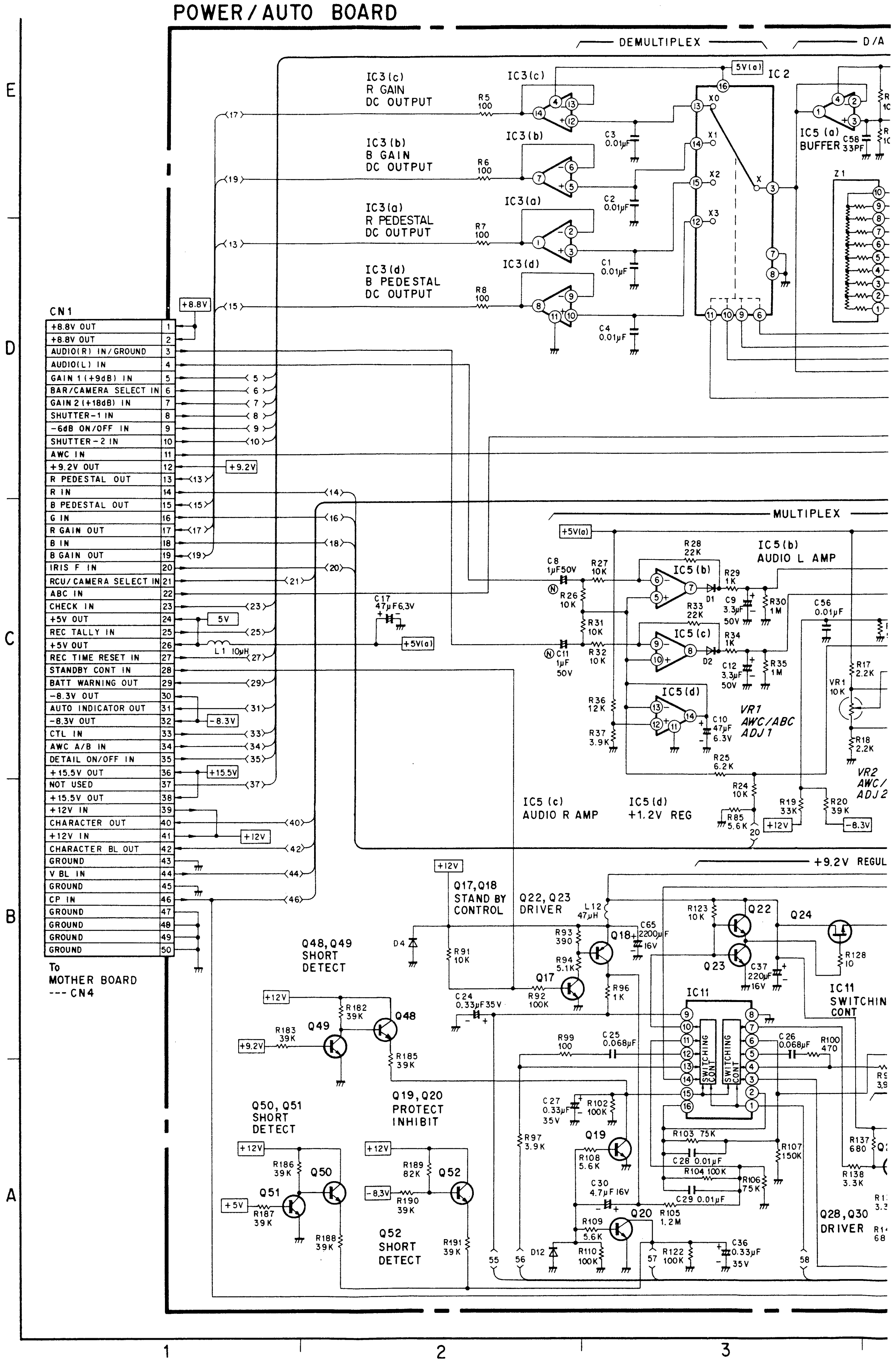
	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC2	0	0	2.2	0	0.2	4.7	0	0	2.5	2.3	0.5	2.2	2.2	2.2	2.2	5.0
IC3	2.5	2.5	2.2	5.0	2.2	2.5	2.5	2.5	2.5	2.2	0	2.3	2.5	2.5		
IC4	2.9	0	—	2.9	2.5	0	0	0	2.5	4.3	0.5	1.3	1.2	1.2	2.0	5.0
IC5	2.2	0	2.2	0	1.2	1.2	1.1	1.3	1.2	1.2	0	1.2	1.2	1.2		
IC6	—	2,7	0	0	3.3	0.4	0	0	0	0	0	3.3	3.2	3.1	2.4	5.0
IC7	0	5.0	5.0	2.6	—	3.0	2.9	2.2	—	0	5.0	0	0	4.3		
IC8	3.8	4.8	0	0	5.0	2.5	2.5	0	0	0	0	0	4.7	4.8	0	0
IC9	0	4.9	0	0	0	0	0	0								
IC10	5.0	1.3	0	1.2	5.0											
IC11	1.7	2.5	1.4	1.4	1.9	1.6	9.5	0	9.1	3.2	1.4	1.6	1.4	1.4	0.2	2.5
IC12	1.7	1.0	1.4	1.4	1.8	1.6	7.2	0	9.1	6.5	1.6	1.8	1.4	1.4	0.2	2.5
IC13	0.9	1.4	1.4	5.5	1.4	1.4	0.6	0.9	1.4	0	-8.6	0	1.4	-0.7		

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1	0.1	1.7	0.2	1.7	0.1	2.2	5.0	2.4	2.2	0	0	4.5	5.0	4.7	2.5	4.2
	Pin17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	0.5	4.9	4.1	0	4.9	0	0	0	0	0	4.7	4.9	4.8	4.9	0	4.3
	Pin33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	0	1.5	0	4.7	0	0	0	0	0.1	3.8	4.8	0	5.0	0	0	5.0
	Pin49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
	4.8	0	0	0	0	8.7	0	0	4.9	4.9	0	0.5	2.9	0.1	2.6	0

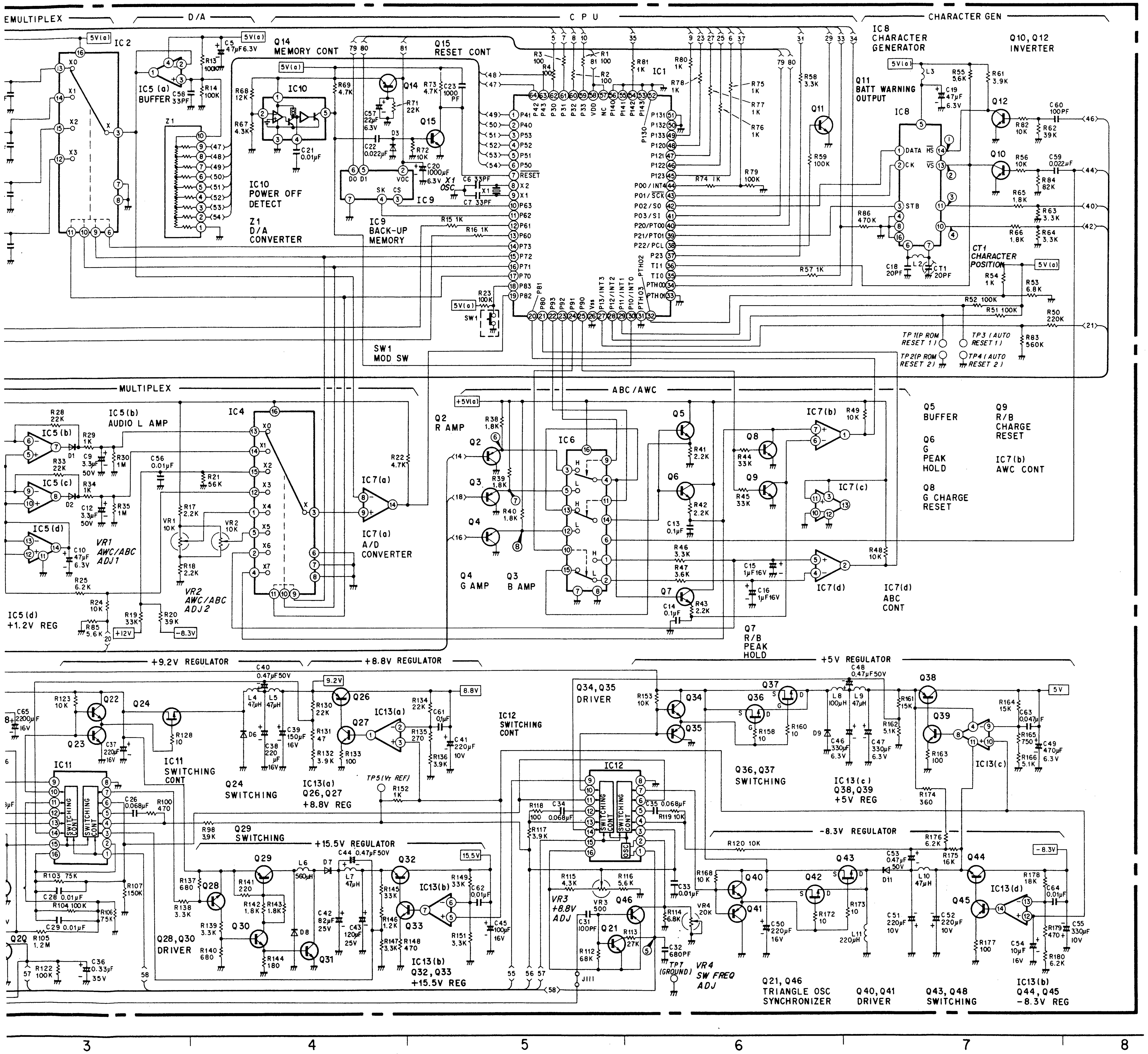
	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q48	Q49
B	0.8	11.8	11.9	0.3	0	15.3	0.6	6.5	6.5	G6.2	G6.2	5.5	0.9	7.2	7.2	G6.9	G6.9	-8.6	-0.7	2.5	0	0.6
C	8.6	0	6.1	9.0	6.7	15.5	15.3	11.9	0	D5.6	D5.6	5.0	4.9	11.9	0	D0.3	D0.3	-8.3	-8.0	1.0	12.0	0
E	0.2	11.9	11.6	0.3	0.3	16.0	0.1	6.0	6.0	S11.9	S11.9	4.9	0.3	6.7	6.7	S11.9	S11.9	-8.0	-0.1	2.5	0.2	0

	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q14	Q15	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q25	Q26
B	2.6	2.6	2.6	3.1	3.1	3.3	0	0	-0.4	0	-0.2	4.3	0	0.6	11.3	0	0	2.5	3.0	3.0	G3.1	9.2
C	0	0	0	5.0	5.0	5.0	2.9	2.9	4.7	9.2	4.8	4.9	5.0	0	11.9	0.2	0.2	1.8	11.9	0	D9.4	8.8
E	3.2	3.3	3.3	2.4	2.9	3.0	0	0	0	0	0	5.0	0	0	12.0	0	0	2.5	3.1	3.1	S11.9	8.6

SCHEMATIC DIAGRAM OF POWE


POWER/AUTO BOARD
DEMULTIPLEX
D/A
MULTIPLEX
+9.2V REGUL
E
D
C
B
A
1
2
3
IC3(c) R GAIN DC OUTPUT
IC3(b) B GAIN DC OUTPUT
IC3(a) R PEDESTAL DC OUTPUT
IC3(d) B PEDESTAL DC OUTPUT
IC 2
IC5(a) BUFFER
IC5(b) AUDIO L AMP
IC5(c) AUDIO R AMP
IC5(d) +1.2V REG
VR1 AWC/ABC ADJ 1
VR2 AWC/ ADJ 2
CN1
+8.8V OUT
+8.8V OUT
AUDIO(R) IN/GROUND
AUDIO(L) IN
GAIN 1(+9dB) IN
BAR/CAMERA SELECT IN
GAIN 2(+18dB) IN
SHUTTER-1 IN
-6dB ON/OFF IN
SHUTTER-2 IN
AWC IN
+9.2V OUT
R PEDESTAL OUT
R IN
B PEDESTAL OUT
G IN
R GAIN OUT
B IN
B GAIN OUT
IRIS F IN
RCU/CAMERA SELECT IN
ABC IN
CHECK IN
+5V OUT
REC TALLY IN
+5V OUT
REC TIME RESET IN
STANDBY CONT IN
BATT WARNING OUT
-8.3V OUT
AUTO INDICATOR OUT
-8.3V OUT
CTL IN
AWC A/B IN
DETAIL ON/OFF IN
+15.5V OUT
NOT USED
+15.5V OUT
+12V IN
CHARACTER OUT
+12V IN
CHARACTER BL OUT
GROUND
V BL IN
GROUND
CP IN
GROUND
GROUND
GROUND
GROUND
To MOTHER BOARD --- CN4
L1 10μH
Q17,Q18 STAND BY CONTROL
Q22,Q23 DRIVER
Q48,Q49 SHORT DETECT
Q50,Q51 SHORT DETECT
Q19,Q20 PROTECT INHIBIT
Q52 SHORT DETECT
IC11 SWITCHING CONT
Q28,Q30 DRIVER
Q24

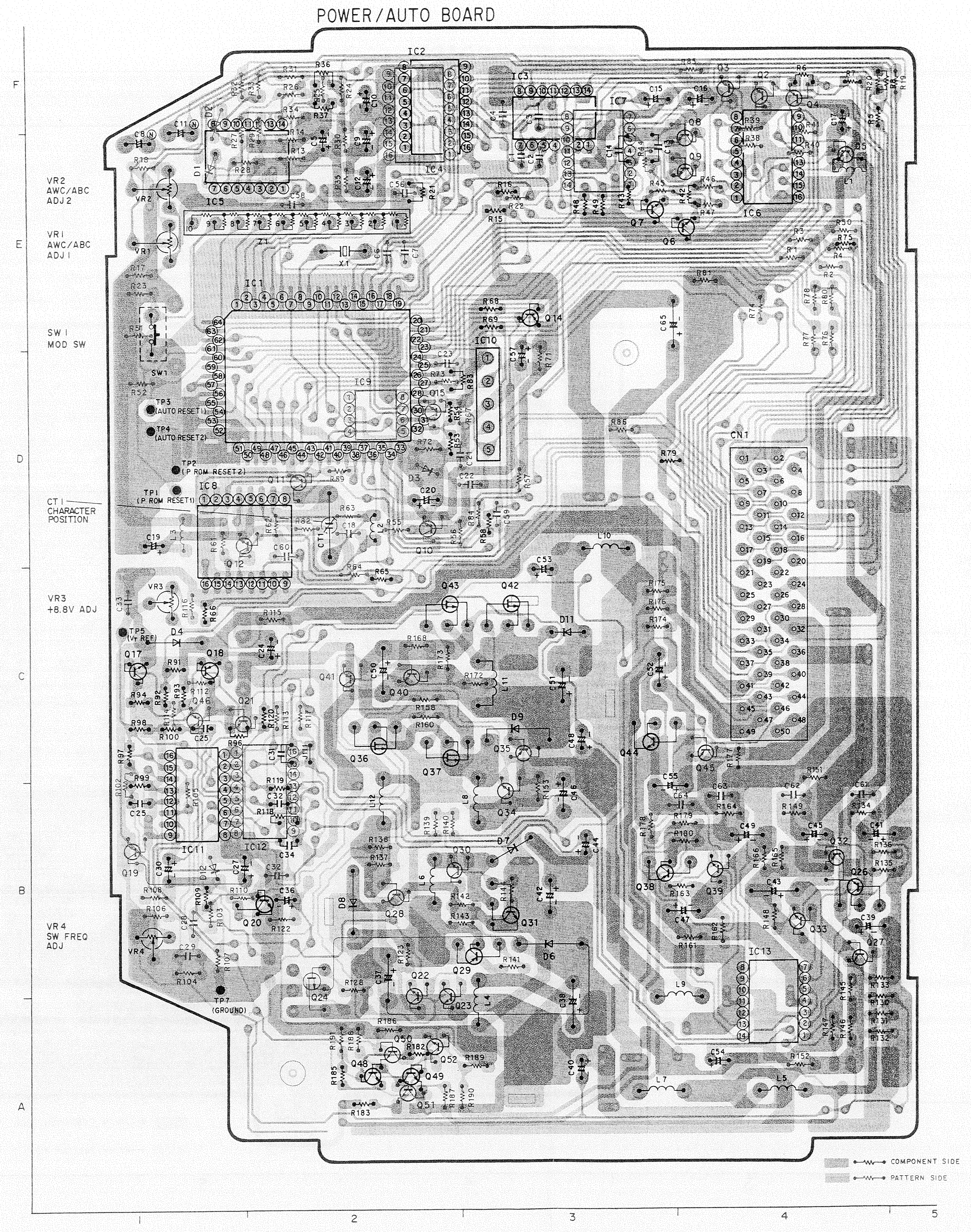
GRAM OF POWER/AUTO BOARD


EMULTIPLEX
D/A
CPU
CHARACTER GEN
IC2
IC5 (a) BUFFER
Q14 MEMORY CONT
Q15 RESET CONT
IC1
IC8 CHARACTER GENERATOR
Q10, Q12 INVERTER
Q11 BATT WARNING OUTPUT
IC10 POWER OFF DETECT
Z1 D/A CONVERTER
IC9 BACK-UP MEMORY
X1 OSC
CT1 CHARACTER POSITION
SW1 MOD SW
TP1 (P ROM RESET 1)
TP2 (P ROM RESET 2)
TP3 (AUTO RESET 1)
TP4 (AUTO RESET 2)
MULTIPLEX
ABC/AWC
IC5 (b) AUDIO L AMP
IC4
IC7 (a) A/D CONVERTER
Q2 R AMP
Q4 G AMP
Q3 B AMP
IC6
Q5 BUFFER
Q6 G PEAK HOLD
Q8 G CHARGE RESET
Q9 R/B CHARGE RESET
IC7 (b) AWC CONT
IC7 (c)
IC7 (d) ABC CONT
Q7 R/B PEAK HOLD
VR1 AWC/ABC ADJ 1
VR2 AWC/ABC ADJ 2
IC5 (d) +1.2V REG
+9.2V REGULATOR
+8.8V REGULATOR
+5V REGULATOR
Q24 SWITCHING
IC11 SWITCHING CONT
IC13 (a) Q26, Q27 +8.8V REG
TP5 (Vr REF)
IC12 SWITCHING CONT
Q34, Q35 DRIVER
Q36, Q37 SWITCHING
IC13 (c) Q38, Q39 +5V REG
Q29 SWITCHING
+15.5V REGULATOR
Q28, Q30 DRIVER
IC13 (b) Q32, Q33 +15.5V REG
VR3 +8.8V ADJ
VR4 SW FREQ ADJ
TP7 (GROUND)
-8.3V REGULATOR
Q21, Q46 TRIANGLE OSC SYNCHRONIZER
Q40, Q41 DRIVER
Q43, Q48 SWITCHING
IC13 (b) Q44, Q45 -8.3V REG
3
4
5
6
7
8

<Index>

IC1	D5
IC2	D2, E3
IC3	E2
IC4	C4
IC5	C3, E3
IC6	C5
IC7	C4, C6
IC8	D7
IC9	D4
IC10	E4
IC11	B3
IC12	B5
IC13	A5, A7, B4
Q2	C5
Q3	C5
Q4	C5
Q5	C6
Q6	C6
Q7	B6
Q8	C6
Q9	C6
Q10	D7
Q11	E6
Q12	E7
Q14	E4
Q15	E5
Q17	B2
Q18	B3
Q19	A3
Q20	A3
Q21	A5
Q22	B3
Q23	B3
Q24	B3
Q26	B4
Q27	B4
Q28	A4
Q29	A4
Q30	A4
Q31	A4
Q32	A4
Q33	A4
Q34	B6
Q35	B6
Q36	B6
Q37	B6
Q38	B7
Q39	B7
Q40	A6
Q41	A6
Q42	A6
Q43	A7
Q44	A7
Q45	A7
Q46	A6
Q48	B2
Q49	B2
Q50	A2
Q51	A1
Q52	A2
D1	C3
D2	C3
D3	E5
D4	B2
D6	B4
D7	A4
D8	A4
D9	B6
D11	A7
D12	A2

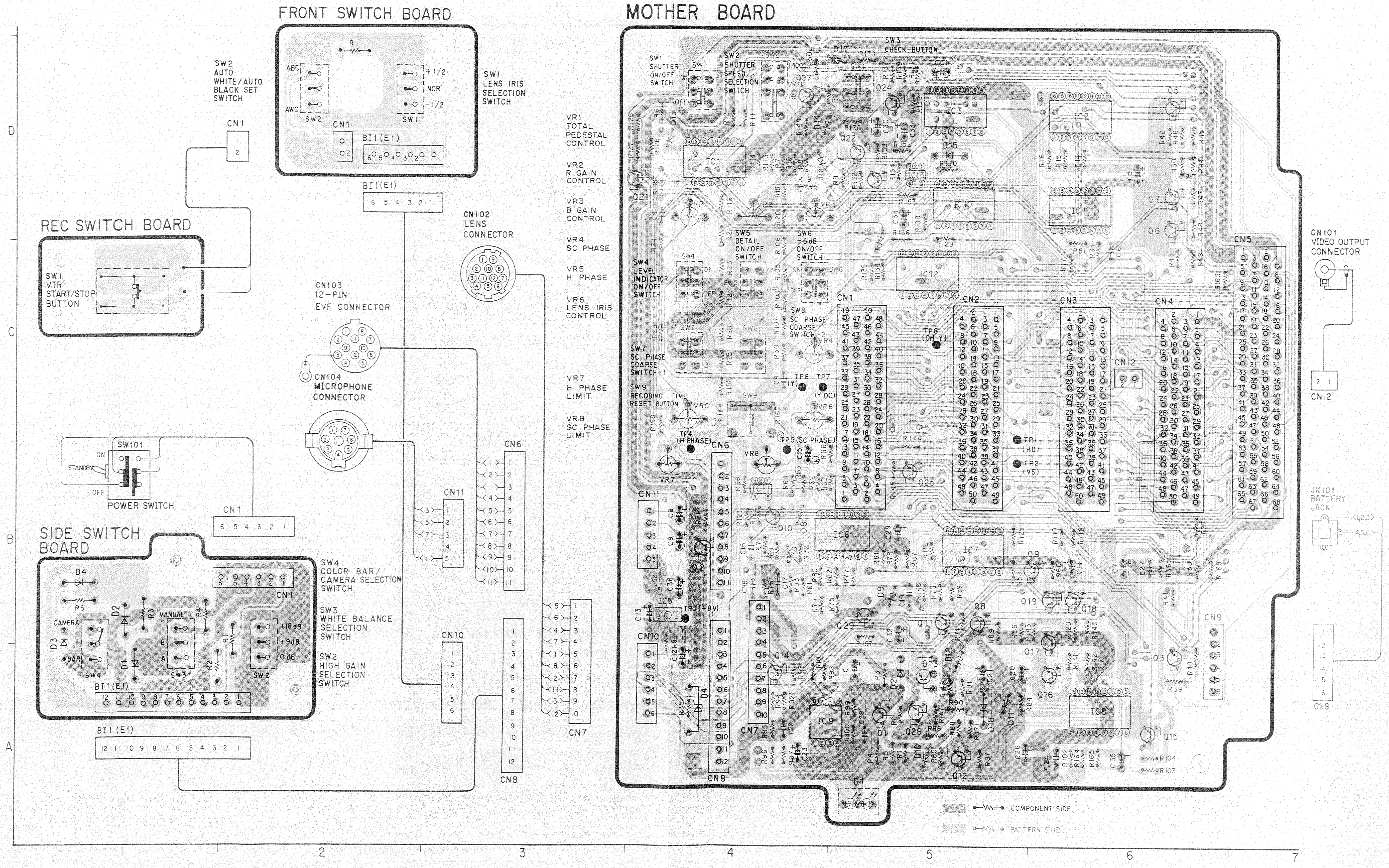
CONDUCTOR VIEW OF POWER/AUTO BOARD

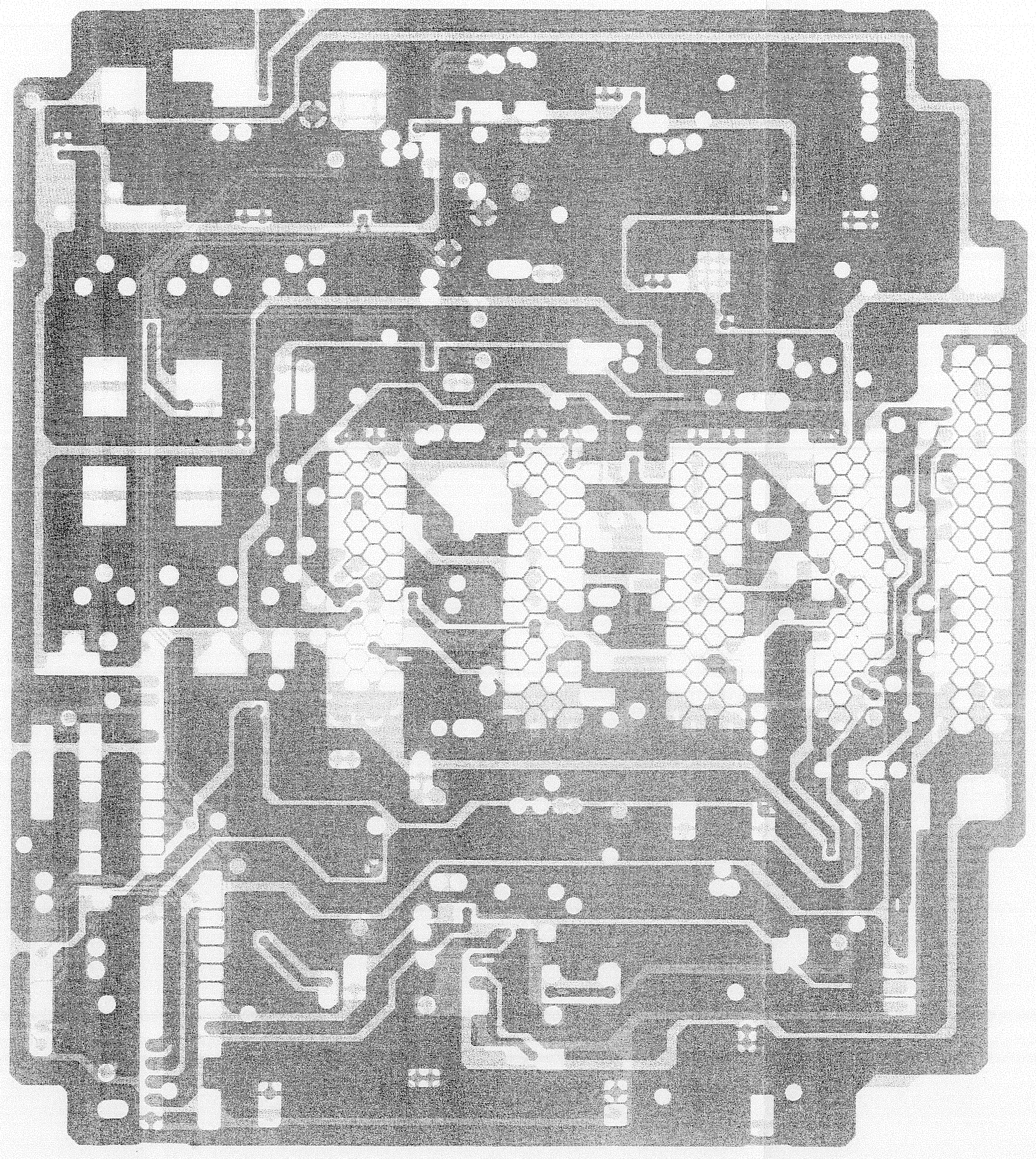

POWER/AUTO BOARD
VR2 AWC/ABC ADJ 2
VR1 AWC/ABC ADJ 1
SW1 MOD SW
CT1 CHARACTER POSITION
VR3 +8.8V ADJ
VR4 SW FREQ ADJ
TP1 (P.ROM RESET1)
TP2 (P.ROM RESET2)
TP3 (AUTO RESET1)
TP4 (AUTO RESET2)
TP5 (Vr REF)
TP7 (GROUND)
CN1
F
E
D
C
B
A
1
2
3
4
5
COMPONENT SIDE
PATTERN SIDE

<Index>

IC1	E2	Q46	C1
IC2	F2	Q48	A2
IC3	F3	Q49	A2
IC4	E2	Q50	A2
IC5	E1	Q51	A2
IC6	E4	Q52	A2
IC7	F3	D1	E1
IC8	D1	D2	F1
IC9	D2	D3	D2
IC10	D3	D4	C1
IC11	B1	D6	B3
IC12	B2	D7	B3
IC13	B4	D8	B2
Q2	F4	D9	C3
Q3	F4	D11	C3
Q4	F4	D12	B1
Q5	E4		
Q6	E4		
Q7	E3		
Q8	F4		
Q9	E4		
Q10	D2		
Q11	D2		
Q12	D2		
Q14	E3		
Q15	D2		
Q17	C1		
Q18	C1		
Q19	B1		
Q20	B2		
Q21	C2		
Q22	B2		
Q23	A3		
Q24	B2		
Q26	B4		
Q27	B4		
Q28	B2		
Q29	B3		
Q30	B3		
Q31	B3		
Q32	B4		
Q33	B4		
Q34	B3		
Q35	C3		
Q36	C2		
Q37	C2		
Q38	B3		
Q39	B4		
Q40	C2		
Q41	C2		
Q42	C3		
Q43	C2		
Q44	C3		
Q45	C4		

CONDUCTOR VIEW OF MOTHER BOARD


FRONT SWITCH BOARD
SW2 AUTO WHITE/AUTO BLACK SET SWITCH
ABC
AWC
SW2
R1
+1/2
NOR
-1/2
SW1
SW1 LENS IRIS SELECTION SWITCH
CN1
BI1(E1)
6 5 4 3 2 1
REC SWITCH BOARD
SW1 VTR START/STOP BUTTON
CN102 LENS CONNECTOR
CN103 12-PIN EVF CONNECTOR
CN104 MICROPHONE CONNECTOR
VR1 TOTAL PEDESTAL CONTROL
VR2 R GAIN CONTROL
VR3 B GAIN CONTROL
VR4 SC PHASE
VR5 H PHASE
VR6 LENS IRIS CONTROL
VR7 H PHASE LIMIT
VR8 SC PHASE LIMIT
SW101
ON
STANDBY
OFF
POWER SWITCH
SIDE SWITCH BOARD
D4
R5
CAMERA
BAR
D3
D2
D1
R3
R4
MANUAL
R1
R2
SW4
SW3
SW2
+18 dB
+9dB
0dB
CN1
BI1(E1)
12 11 10 9 8 7 6 5 4 3 2 1
SW4 COLOR BAR/ CAMERA SELECTION SWITCH
SW3 WHITE BALANCE SELECTION SWITCH
SW2 HIGH GAIN SELECTION SWITCH
CN6
CN11
CN10
CN8
CN7
MOTHER BOARD
SW1 SHUTTER ON/OFF SWITCH
SW2 SHUTTER SPEED SELECTION SWITCH
SW3 CHECK BUTTON
SW4 LEVEL INDICATOR ON/OFF SWITCH
SW5 DETAIL ON/OFF SWITCH
SW6 -6dB ON/OFF SWITCH
SW7 SC PHASE COARSE SWITCH-1
SW8 SC PHASE COARSE SWITCH-2
SW9 RECODING TIME RESET BUTTON
TP1 (HD)
TP2 (VS)
TP3 (+8V)
TP4 (H PHASE)
TP5 (SC PHASE)
TP6 (Y)
TP7 (Y DC)
TP8 (OH Y)
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
D1
CN101 VIDEO OUTPUT CONNECTOR
CN12
JK101 BATTERY JACK
CN9
COMPONENT SIDE
PATTERN SIDE
A
B
C
D
1
2
3
4
5
6
7


▨ INTERMEDIATE PATTERN
░ INTERMEDIATE PATTERN

SCHEMATIC DIAGRAM OF MOTI

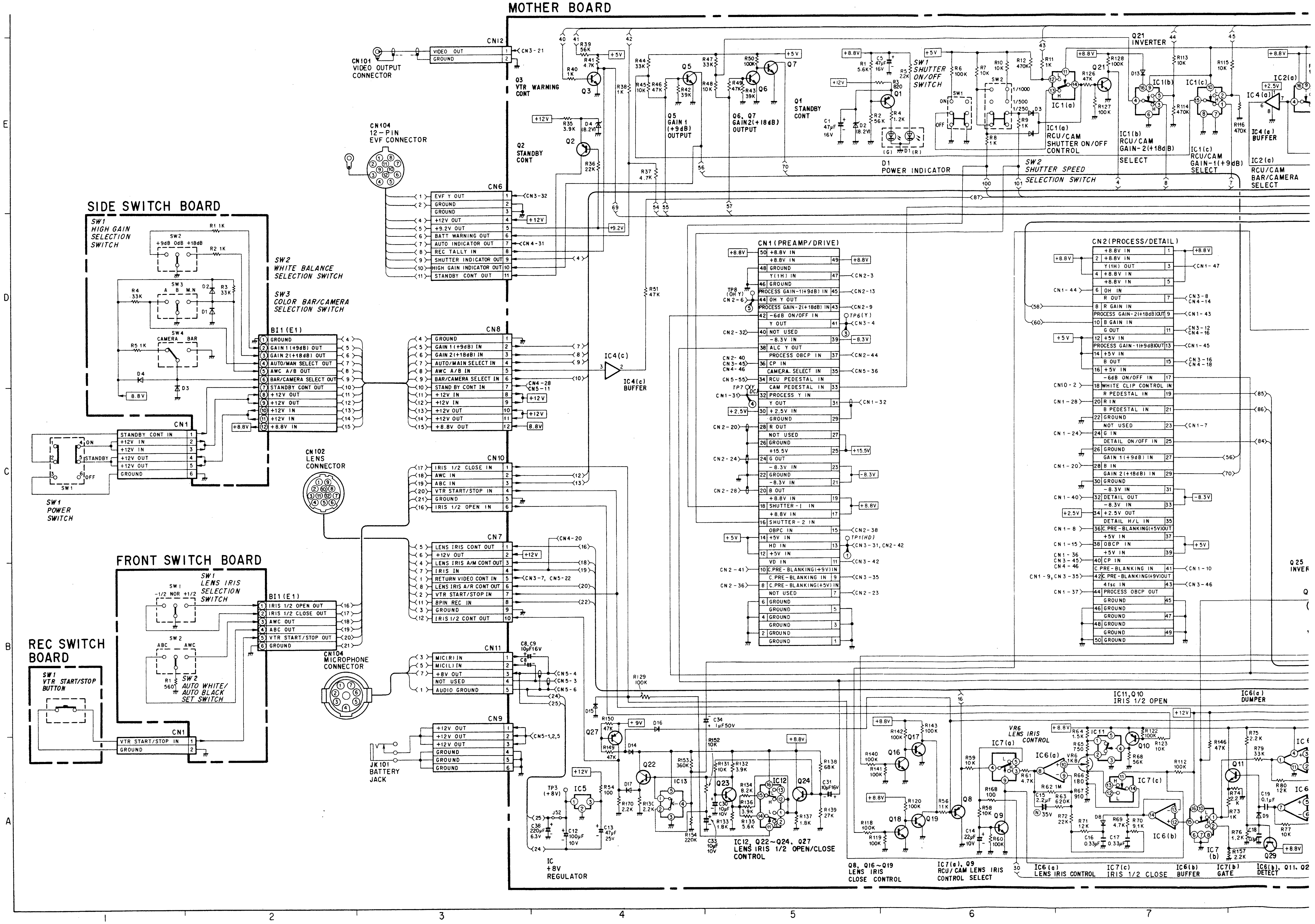
<Index> (Conductor view)

MOTHER BOARD

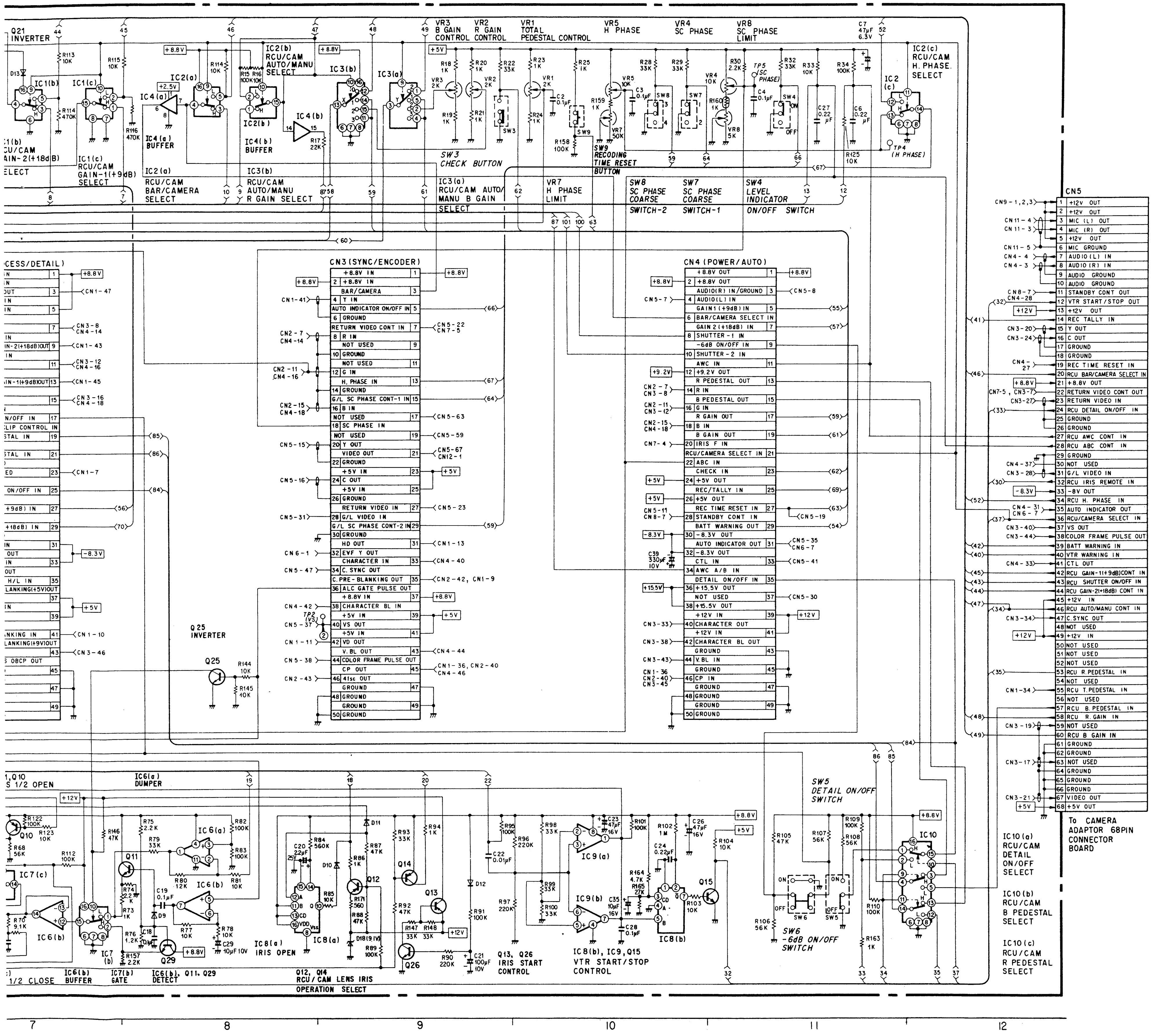
IC1	D4
IC2	D6
IC3	D5
IC4	D6
IC5	B4
IC6	B5
IC7	B5
IC8	A6
IC9	A4
IC10	D5
IC11	B4
IC12	C5
IC13	D5
Q1	A5
Q2	B4
Q3	A6
Q5	D6
Q6	D6
Q7	D6
Q8	B5
Q9	B6
Q10	B4
Q11	B5
Q12	A5
Q13	A5
Q14	A4
Q15	A6
Q16	A6
Q17	B6
Q18	B6
Q19	B6
Q21	D4
Q22	D5
Q23	D5
Q24	D5
Q25	B5
Q26	A5
Q27	D4
Q29	B5
D1	A5
D2	A5
D3	D4
D4	A4
D8	B4
D9	B5
D10	A5
D11	A5
D12	A5
D13	D4
D14	D4
D15	D5
D16	D5
D17	D5
D18	A5

SIDE SWITCH BOARD

D1	A1
D2	B1
D3	B1
D4	B1


MOTHER BOARD
SIDE SWITCH BOARD
FRONT SWITCH BOARD
REC SWITCH BOARD
SW1 HIGH GAIN SELECTION SWITCH
SW2 WHITE BALANCE SELECTION SWITCH
SW3 COLOR BAR/CAMERA SELECTION SWITCH
SW1 POWER SWITCH
SW1 LENS IRIS SELECTION SWITCH
SW2 AUTO WHITE/AUTO BLACK SET SWITCH
SW1 VTR START/STOP BUTTON
CN101 VIDEO OUTPUT CONNECTOR
CN104 12-PIN EVF CONNECTOR
CN102 LENS CONNECTOR
CN104 MICROPHONE CONNECTOR
JK101 BATTERY JACK
CN1 (PREAMP/DRIVE)
CN2 (PROCESS/DETAIL)
Q3 VTR WARNING CONT
Q2 STANDBY CONT
Q5 GAIN 1 (+9dB) OUTPUT
Q6, Q7 GAIN 2 (+18dB) OUTPUT
Q1 STANDBY CONT
SW1 SHUTTER ON/OFF SWITCH
SW2 SHUTTER SPEED SELECTION SWITCH
D1 POWER INDICATOR
Q21 INVERTER
IC1(a) RCU/CAM SHUTTER ON/OFF CONTROL
IC1(b) RCU/CAM GAIN-2 (+18dB) SELECT
IC1(c) RCU/CAM GAIN-1 (+9dB) SELECT
IC2(a) RCU/CAM BAR/CAMERA SELECT
IC4(a) BUFFER
IC4(c) BUFFER
IC +8V REGULATOR
IC12, Q22~Q24, Q27 LENS IRIS 1/2 OPEN/CLOSE CONTROL
Q8, Q16~Q19 LENS IRIS CLOSE CONTROL
IC7(a), Q9 RCU/CAM LENS IRIS CONTROL SELECT
VR6 LENS IRIS CONTROL
IC6(a) LENS IRIS CONTROL
IC7(c) IRIS 1/2 CLOSE
IC6(b) BUFFER
IC7(b) GATE
IC6(b), Q11, Q2 DETECT
IC11, Q10 IRIS 1/2 OPEN
IC6(a) DUMPER
Q25 INVER
1
2
3
4
5
6
7
A
B
C
D
E

AGRAM OF MOTHER BOARD


Q21 INVERTER
IC1(b)
IC1(c)
IC2(a)
IC2(b) RCU/CAM AUTO/MANU SELECT
IC3(b)
IC3(a)
IC4(a) BUFFER
IC4(b) BUFFER
IC1(c) RCU/CAM GAIN-1(+9dB) SELECT
IC2(a) RCU/CAM BAR/CAMERA SELECT
IC3(b) RCU/CAM AUTO/MANU R GAIN SELECT
IC3(a) RCU/CAM AUTO/MANU B GAIN SELECT
VR3 B GAIN CONTROL
VR2 R GAIN CONTROL
VR1 TOTAL PEDESTAL CONTROL
VR5 H PHASE
VR4 SC PHASE
VR8 SC PHASE LIMIT
VR7 H PHASE LIMIT
SW3 CHECK BUTTON
SW9 RECODING TIME RESET BUTTON
SW8 SC PHASE COARSE SWITCH-2
SW7 SC PHASE COARSE SWITCH-1
SW4 LEVEL INDICATOR ON/OFF SWITCH
IC2(c) RCU/CAM H. PHASE SELECT
TP4 (H PHASE)
TP5 (SC PHASE)
CN3 (SYNC/ENCODER)
CN4 (POWER/AUTO)
CN5
Q25 INVERTER
IC6(a) DUMPER
IC6(b) BUFFER
IC7(b) GATE
IC6(b), Q11, Q29 DETECT
IC8(a) IRIS OPEN
Q12, Q14 RCU/CAM LENS IRIS OPERATION SELECT
Q13, Q26 IRIS START CONTROL
IC8(b), IC9, Q15 VTR START/STOP CONTROL
SW5 DETAIL ON/OFF SWITCH
SW6 -6dB ON/OFF SWITCH
IC10
IC10(a) RCU/CAM DETAIL ON/OFF SELECT
IC10(b) RCU/CAM B PEDESTAL SELECT
IC10(c) RCU/CAM R PEDESTAL SELECT
To CAMERA ADAPTOR 68PIN CONNECTOR BOARD
1/2 CLOSE
S 1/2 OPEN
7
8
9
10
11
12

<Index> (Schematic)

MOTHER BOARD

IC1	E7
IC2	E8, E11
IC3	E9
IC4	D4, E8
IC5	A4
IC6	A7, A8
IC7	A6, A7
IC8	A8, A10
IC9	A10
IC10	A12
IC11	A7
IC12	A5
IC13	A4
Q1	E6
Q2	E4
Q3	E4
Q5	E4
Q6	E5
Q7	E5
Q8	A6
Q9	A6
Q10	A7
Q11	A8
Q12	A9
Q13	A9
Q14	A9
Q15	A11
Q16	A6
Q17	A6
Q18	A6
Q19	A6
Q21	E7
Q22	A4
Q23	A5
Q24	A5
Q25	B8
Q26	A9
Q27	A4
Q29	A8
D1	E6
D2	E5
D3	E6
D4	E4
D8	A7
D9	A8
D10	A9
D11	A9
D12	A9
D13	E7
D14	A4
D15	B4
D16	B4
D17	A4
D18	A9

SIDE SWITCH BOARD

D1	D2
D2	D2
D3	C1
D4	D1

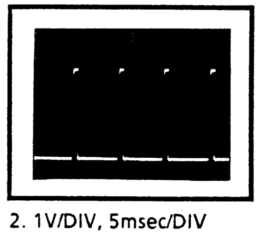
<Voltages>

	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC13
Pin 1	0.1	0	-0.4	5.0	11.7	7.8	2.4	0	8.7	8.8	5.2	1.7	5.2
2	0	8.8	2.5	5.0	0.2	4.4	2.5	8.0	2.9	8.7	4.2	0.3	5.2
3	3.4	8.6	2.5	8.8	5.1	4.4	8.1	7.5	4.3	2.5	0	0.3	0
4	3.4	8.6	2.5	0	0.2	8.8	8.1	0	0	2.5	0	0.3	3.3
5	0	8.8	2.5	0		4.7	0	8.7	5.8	-0.5	8.8	0.3	8.8
6	0	0	0	5.0		4.7	0	0	4.3	0		0	
7	0	0	0	8.6		4.7	0	8.6	8.7	0		0	
8	0	0	0	0		8.1	0	0	8.8	0		0	
9	6.7	6.7	6.7	0		2.6	8.9	8.8		8.8		0.3	
10	0	6.7	0	0		3.2	8.1	0		6.7		8.7	
11	6.7	6.7	2.5	0.3		0	10.1	8.8		8.8		8.4	
12	4.8	-0.5	-0.5	0		2.4	2.2	9.0		-0.5		1.7	
13	0	3.6	2.5	0		2.4	1.8	7.5		2.5		1.7	
14	0	3.6	2.5	0		2.4	1.8	8.3		2.5		1.7	
15	0.2	0	2.5	0			2.5	0		8.8		1.7	
16	8.3	8.8	8.8	0			12.0	8.8		8.8		8.8	

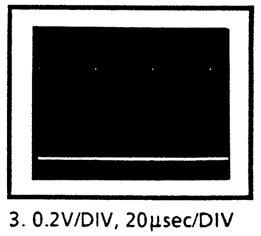
	B	C	E
Q1	8.0	0.1	8.3
Q2	9.2	0	8.2
Q3	0.6	0	0
Q5	0.1	9.2	0
Q6	0.6	0	0
Q7	0	8.9	0
Q8	8.8	0	8.1
Q9	0	8.9	0
Q10	8.7	0	8.8
Q11	2.9	8.8	2.3
Q12	9.1	0	9.2
Q13	0	12.0	0
Q14	8.8	0	8.8
Q15	0.7	0	0
Q16	0.6	0	0
Q17	0	8.8	0
Q18	0.6	0	0
Q19	0	8.8	0
Q21	0	9.2	0
Q22	5.2	8.8	4.6
Q23	2.3	5.2	1.7
Q24	2.3	8.8	1.7
Q25	0.2	8.1	0
Q26	0.7	0.1	0
Q27	9.1	3.9	9.2
Q29	3.1	8.8	2.5

<Waveforms>

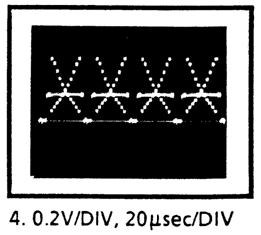
1. 1V/DIV, 20µsec/DIV



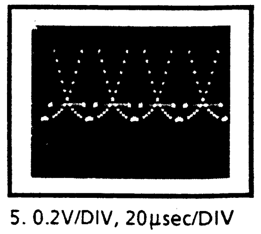
2. 1V/DIV, 5msec/DIV



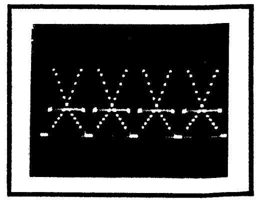
3. 0.2V/DIV, 20µsec/DIV



4. 0.2V/DIV, 20µsec/DIV



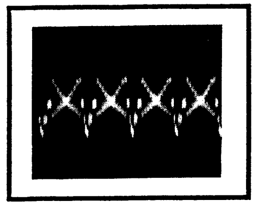
5. 0.2V/DIV, 20µsec/DIV



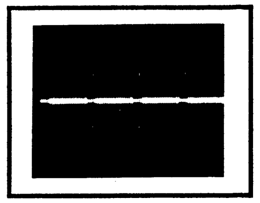
SCHEMATIC DIAGRAM OF MAIN BOARD F

<Waveforms>

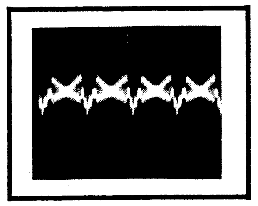
1. 20mV/DIV, 20µsec/DIV



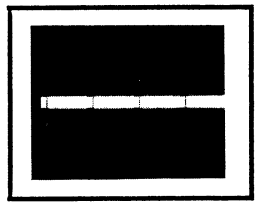
7. 0.2V/DIV, 20µsec/DIV



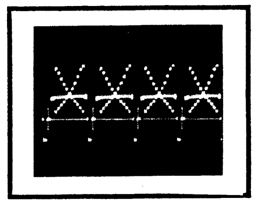
2. 20mV/DIV, 20µsec/DIV



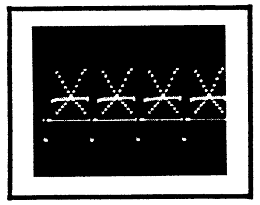
8. 0.2V/DIV, 20µsec/DIV



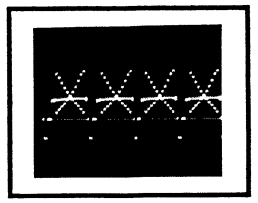
3. 0.5V/DIV, 20µsec/DIV



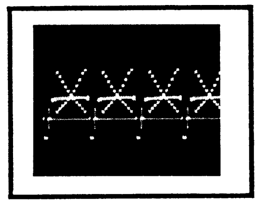
9. 0.5V/DIV, 20µsec/DIV



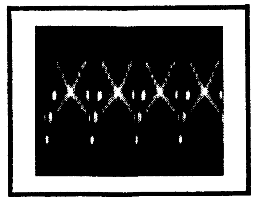
4. 0.5V/DIV, 20µsec/DIV



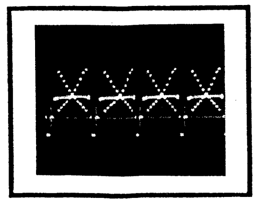
10. 0.5V/DIV, 20µsec/DIV

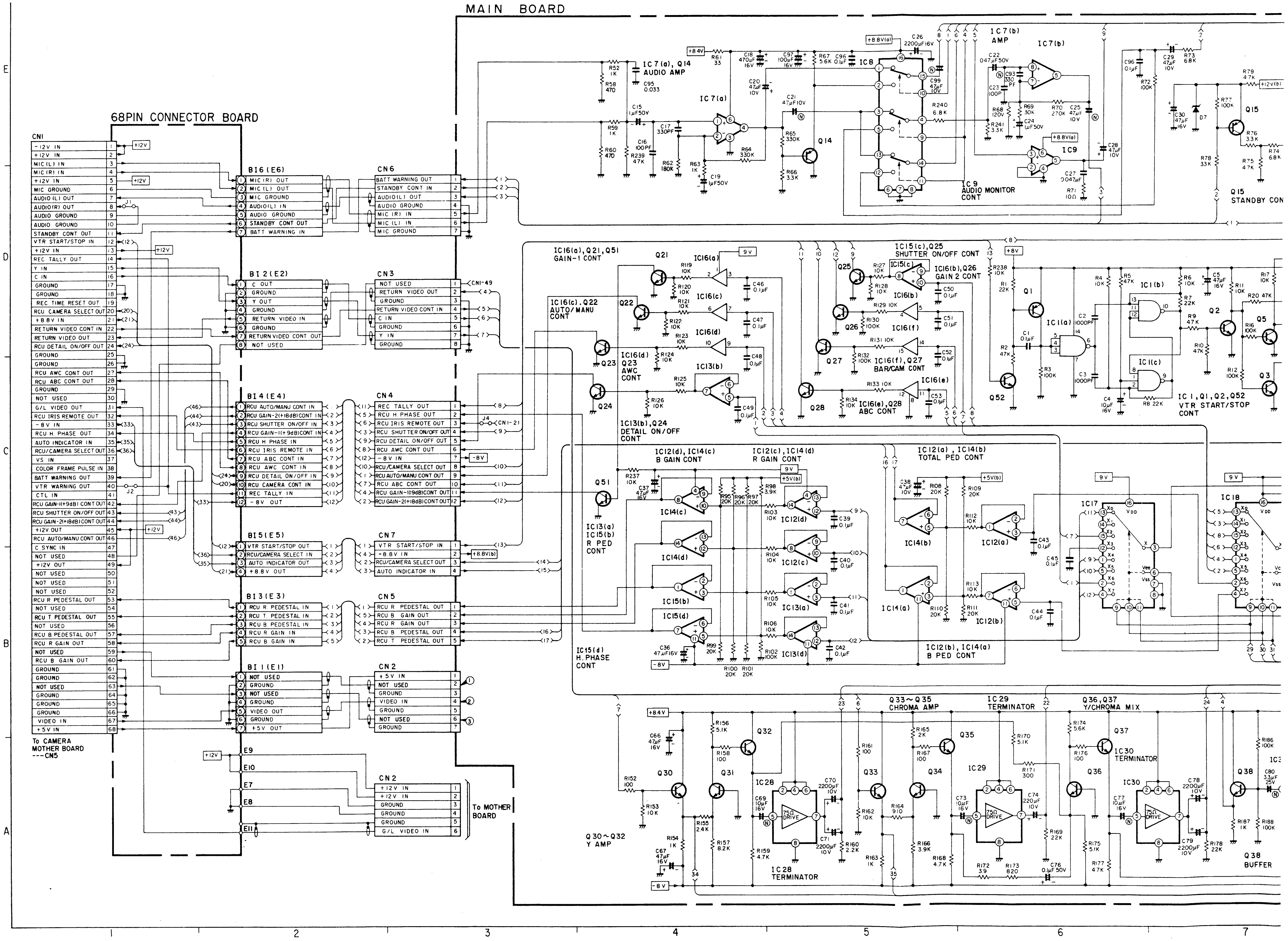


5. 20V/DIV, 20µsec/DIV

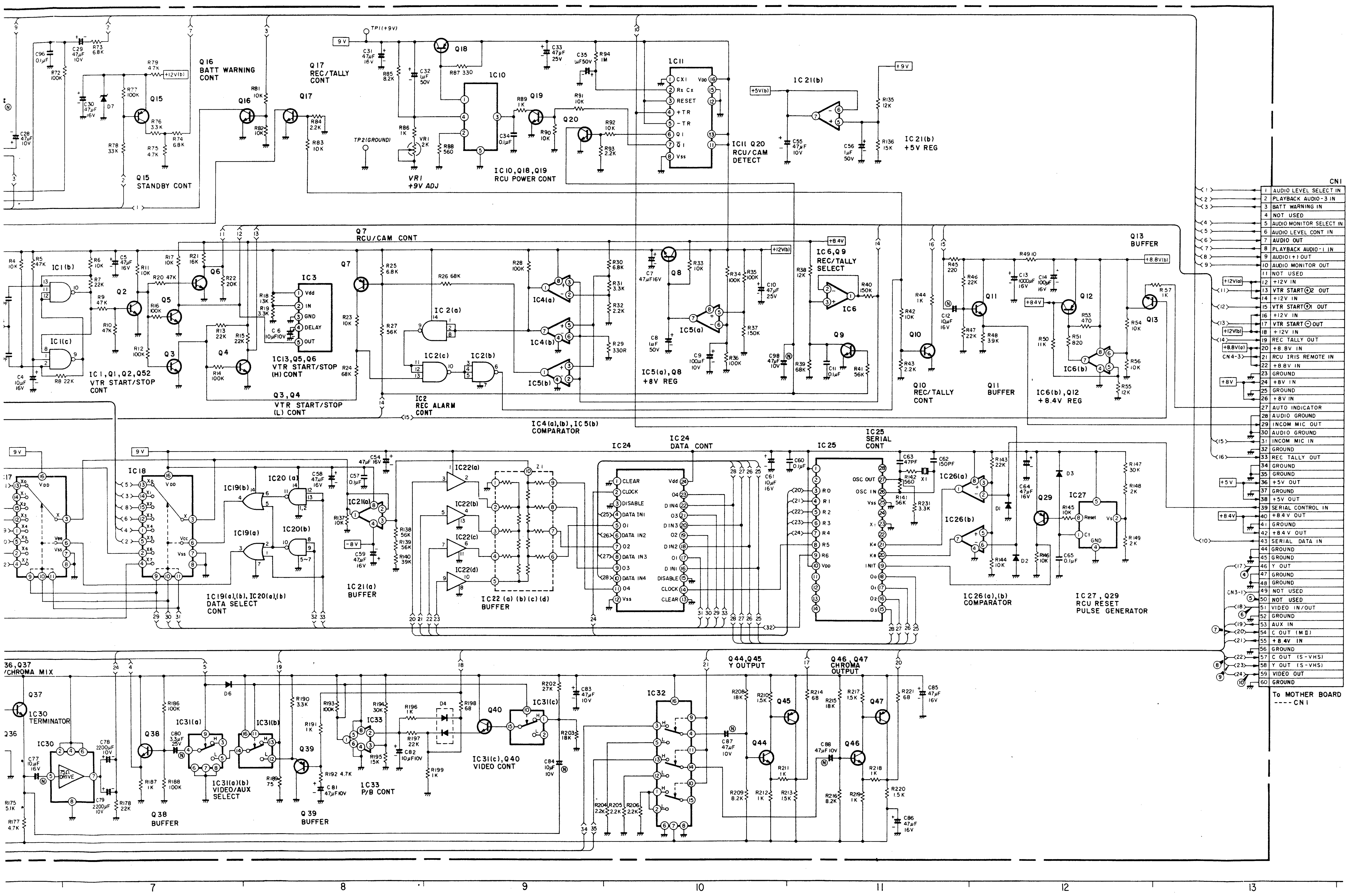


6. 0.5V/DIV, 20µsec/DIV





F MAIN BOARD FOR CAMERA ADAPTOR


Q16 BATT WARNING CONT
Q17 REC/TALLY CONT
Q15 STANDBY CONT
TP1(+9V)
TP2(GROUND)
VR1 +9V ADJ
IC10,Q18,Q19 RCU POWER CONT
IC11 Q20 RCU/CAM DETECT
IC21(b) +5V REG
Q7 RCU/CAM CONT
IC1,Q1,Q2,Q52 VTR START/STOP CONT
IC13,Q5,Q6 VTR START/STOP (H) CONT
Q3,Q4 VTR START/STOP (L) CONT
IC2 REC ALARM CONT
IC4(a),(b),IC5(b) COMPARATOR
IC5(a),Q8 +8V REG
IC6,Q9 REC/TALLY SELECT
Q10 REC/TALLY CONT
Q11 BUFFER
Q13 BUFFER
IC6(b),Q12 +8.4V REG
IC19(a),(b),IC20(a),(b) DATA SELECT CONT
IC21(a) BUFFER
IC22(a)(b)(c)(d) BUFFER
IC24 DATA CONT
IC25 SERIAL CONT
IC26(a),(b) COMPARATOR
IC27,Q29 RCU RESET PULSE GENERATOR
Q36,Q37 Y/CHROMA MIX
IC30 TERMINATOR
Q38 BUFFER
IC31(a)(b) VIDEO/AUX SELECT
Q39 BUFFER
IC33 P/B CONT
IC31(c),Q40 VIDEO CONT
Q44,Q45 Y OUTPUT
Q46,Q47 CHROMA OUTPUT
CN1
1 AUDIO LEVEL SELECT IN
2 PLAYBACK AUDIO-3 IN
3 BATT WARNING IN
4 NOT USED
5 AUDIO MONITOR SELECT IN
6 AUDIO LEVEL CONT IN
7 AUDIO OUT
8 PLAYBACK AUDIO-1 IN
9 AUDIO(+) OUT
10 AUDIO MONITOR OUT
11 NOT USED
12 +12V IN
13 VTR START⊕2 OUT
14 +12V IN
15 VTR START⊕1 OUT
16 +12V IN
17 VTR START ⊖ OUT
18 +12V IN
19 REC TALLY OUT
20 +8.8V IN
21 RCU IRIS REMOTE IN
22 +8.8V IN
23 GROUND
24 +8V IN
25 GROUND
26 +8V IN
27 AUTO INDICATOR
28 AUDIO GROUND
29 INCOM MIC OUT
30 AUDIO GROUND
31 INCOM MIC IN
32 GROUND
33 REC TALLY OUT
34 GROUND
35 GROUND
36 +5V OUT
37 GROUND
38 +5V OUT
39 SERIAL CONTROL IN
40 +8.4V OUT
41 GROUND
42 +8.4V OUT
43 SERIAL DATA IN
44 GROUND
45 GROUND
46 Y OUT
47 GROUND
48 GROUND
49 NOT USED
50 NOT USED
51 VIDEO IN/OUT
52 GROUND
53 AUX IN
54 C OUT (M II)
55 +8.4V IN
56 GROUND
57 C OUT (S-VHS)
58 Y OUT (S-VHS)
59 VIDEO OUT
60 GROUND
To MOTHER BOARD ----CN1
7
8
9
10
11
12
13

<Index>

IC1	C7, D6, D7
IC2	C9, D9
IC3	D8
IC4	D9
IC5	C9, D10
IC6	C12, D11
IC7	E4, E6
IC8	E5
IC9	E6
IC10	E9
IC11	E10
IC12	B5, B6, C5, C6
IC13	B5, C4
IC14	B5, C4, C5
IC15	B4, D5
IC16	C5, D4, D5
IC17	B6
IC18	B7
IC19	B8, C8
IC20	B8, C8
IC21	C8, E11
IC22	B9, C9
IC24	B10
IC25	B11
IC26	B12, C12
IC27	B2
IC28	A5
IC29	A6
IC30	A7
IC31	A7, A8, A9
IC32	A10
IC33	A8
Q1	D6
Q2	D7
Q3	C7
Q4	C8
Q5	D7
Q6	D7
Q7	D8
Q8	D10
Q9	C11
Q10	C11
Q11	D12
Q12	D12
Q13	D12
Q14	E5
Q15	E7
Q16	E8
Q17	E8
Q18	E9
Q19	E9
Q20	E9
Q21	D4
Q22	D4
Q23	D4
Q24	C4
Q25	D5
Q26	D5
Q27	D5
Q28	C5
Q29	B12
Q30	A4
Q31	A4
Q32	A4
Q33	A5
Q34	A5
Q35	A5
Q36	A6
Q37	A6
Q38	A7
Q39	A8
Q40	A9
Q44	A10
Q45	A11
Q46	A11
Q47	A11
Q51	C4
Q52	C6
D1	C12
D2	B12
D3	C12
D4	A9
D6	B7
D7	E7

CONDUCTOR VIEW OF MAIN BOARD FOR CAMERA ADAPTOR

<Voltages>

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1	0.7	0.7	0	0	0	0	0	0.5	0.7	0.5	0.7	0.7	0	0.7		
IC2	0.5	0.5	0	0	0	0	0	0.5	0	0	0	0	0	0.7		
IC3	0.7	0.2	0	0	0.1											
IC4	0.5	1.5	0	0	3.7	0	0.5	0.7								
IC5	1.4	0	3.7	0	0.7	0.5	0.1	1.1								
IC7	1.4	1.5	0.2	5.4	4.5	8.0	1.5	1.4								
IC8	5.1	0.9	0.2	0.2	0	0.2	0.2	0.2	8.0	8.0	8.0	0	0.2	0.2	5.1	8.0
IC9	1.4	0.2	0.2	0.2	4.2	8.0	4.2	1.4								
IC10	0	-0.1	0	0	1.1											
IC11	0	1.1	1.1	0	1.1	0	0.6	0	1.1	0.2	1.1	0	1.1	0.2	0	1.1
IC12	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.5	-8.3	-0.5	-0.6	-0.6		
IC13	-0.6	-0.6	-0.6	-0.5	-0.5	-0.6	-0.6	-0.3	0	-0.5	-8.3	-0.1	-0.3	-0.3		
IC14	-0.4	-0.4	-0.4	-0.5	-0.4	-0.6	-0.6	-0.4	-0.4	-0.4	-8.3	-0.4	-0.4	-0.4		
IC15	-0.4	-0.4	-0.4	-0.5	-0.4	-0.4	-0.4	-0.6	0	-0.5	-8.3	0	-0.8	-		
IC16	-0.5	-0.1	-0.5	-0.4	-0.5	-0.1	-0.5	0	-0.5	-0.1	-0.5	-0.1	0	-0.5	-0.4	0
IC17	-0.5	0	-0.4	-0.2	-0.5	-0.5	0	0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
IC18	-0.5	0	-0.5	0	0	-0.5	0	0	-0.5	0	-0.5	-0.5	0	-0.5	-0.5	-0.5
IC19	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	0	0	0	-0.5	-0.5	0	0	-0.5		
IC20	0	0	-0.5	-0.5	0	0	0	-0.1	-0.1	-0.5	-0.5	-0.5	-0.5	-0.5		
IC21	-0.4	-0.4	-0.3	-8.3	0	-0.4	0	-0.5								
IC22	-0.5	-0.5	-0.1	-0.5	-0.1	-0.5	-0.1	0	-0.1	0	0	-0.5	0	0	-0.5	0
IC26	0	0	-0.1	0	-0.1	0	0	-0.5								
IC27	-0.3	-0.0	0	0	-0.5	0	0	-0.4								
IC28	3.5	8.4	5.0	8.4	5.0	8.4	3.4	0								
IC29	5.1	8.4	8.0	8.4	5.0	8.4	4.2	0								
IC30	3.5	8.4	0	8.4	4.2	8.4	3.4	0								
IC31	3.3	0	3.2	0	0	0	0	0	8.7	0	0	0	0	0	3.3	8.4
IC32	0	0	-0.8	-0.9	0	0	-8.3	0	8.4	8.4	8.4	0	-0.8	-0.8	0	8.4
IC33	8.5	1.8	2.8	0	8.4	0	0	8.4								

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC24	0	-0.1	0	-0.1	-0.5	-0.3	-0.5	-0.2	-0.5	-0.1	-0.5	0	0	-0.1	0	-0.1
IC25	-0.5	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
	Pin17	18	19	20	21	22	23	24	25	26	27	28				
IC24	-0.5	-0.3	-0.5	-0.2	-0.5	-0.1	-0.5	-0.5								
IC25	-0.3	-0.1	-0	-0.1	-0.1	0	0	0	0	0	0	0				

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
B	0.7	0.3	0.6	-	0.6	-	1.4	0.1	0.6	0	4.3	8.1	0	0.2	8.1	0	0
C	0	0.7	2.6	-	0.1	-	1.4	1.1	0	0	8.8	8.4	8.8	0.2	0.2	9.2	0.7
E	0.7	0	0	-	0	-	0.7	0.7	0	0	3.7	8.8	0	0.9	1.4	0	0

	Q18	Q19	Q20	Q21	Q522	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34
B	1.1	0.3	0	0	0	0	-0.3	-0.3	-0.3	-0.3	0	-0.4	-0.2	0	3.0	-0.2	0
C	-0.5	0	6.8	-0.5	8.8	5.0	8.7	4.8	0	8.8	4.6	0	8.4	3.0	8.4	8.4	3.9
E	1.1	0	0	0	0	0	0	0	0	0	0	-0.6	-0.9	-0.6	2.4	-0.9	-0.6

	Q35	Q36	Q37	Q38	Q39	Q40	Q44	Q45	Q46	Q47	Q51	Q52
B	3.9	0	3.0	3.6	2.1	3.3	-0.3	7.8	-3.0	7.8	-0.5	0
C	8.4	3.0	8.4	8.4	0	0	7.8	0.7	7.8	0.6	0	0.7
E	3.3	-0.6	2.4	3.0	2.7	2.7	-3.5	8.4	-3.6	8.4	0	0

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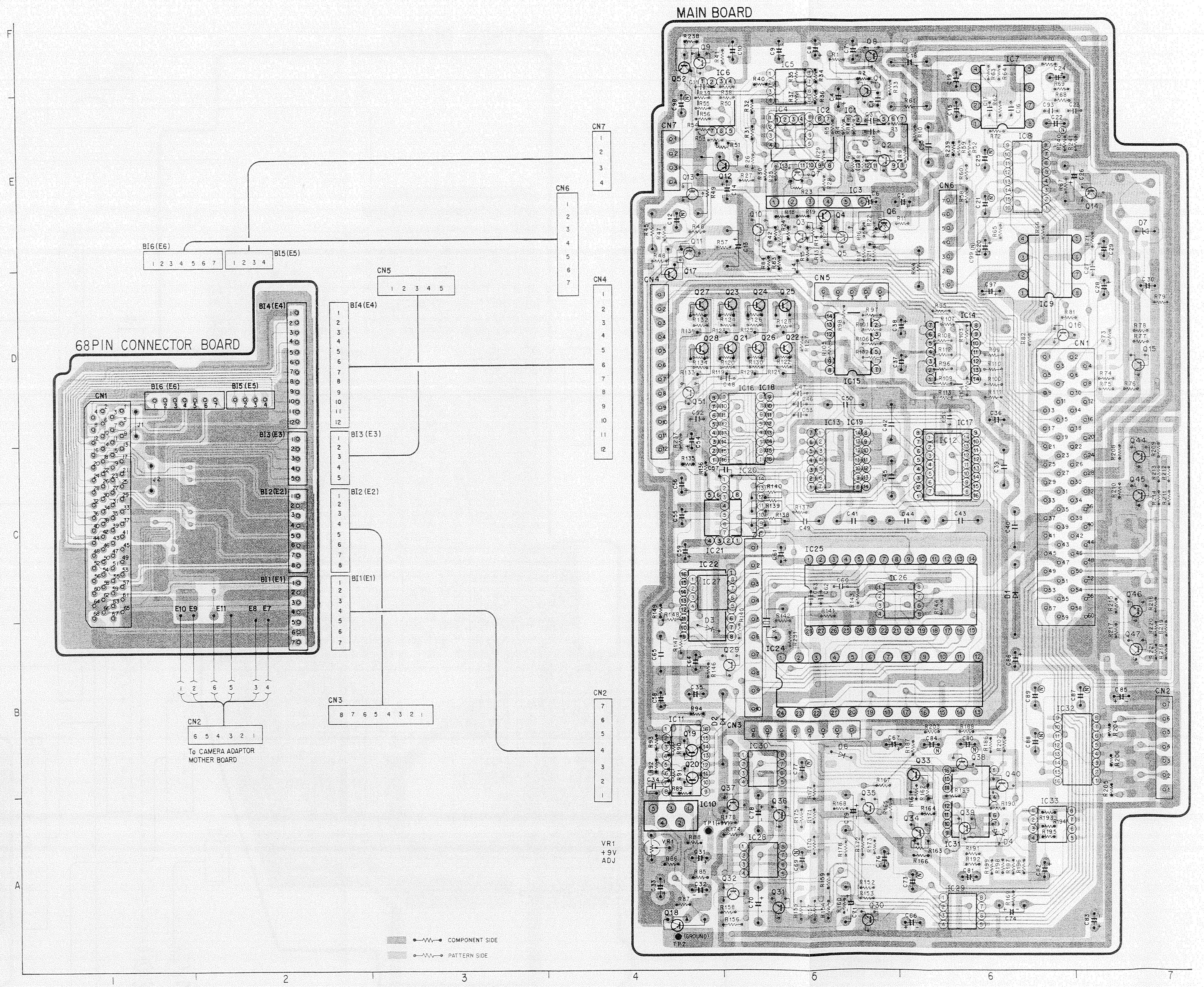
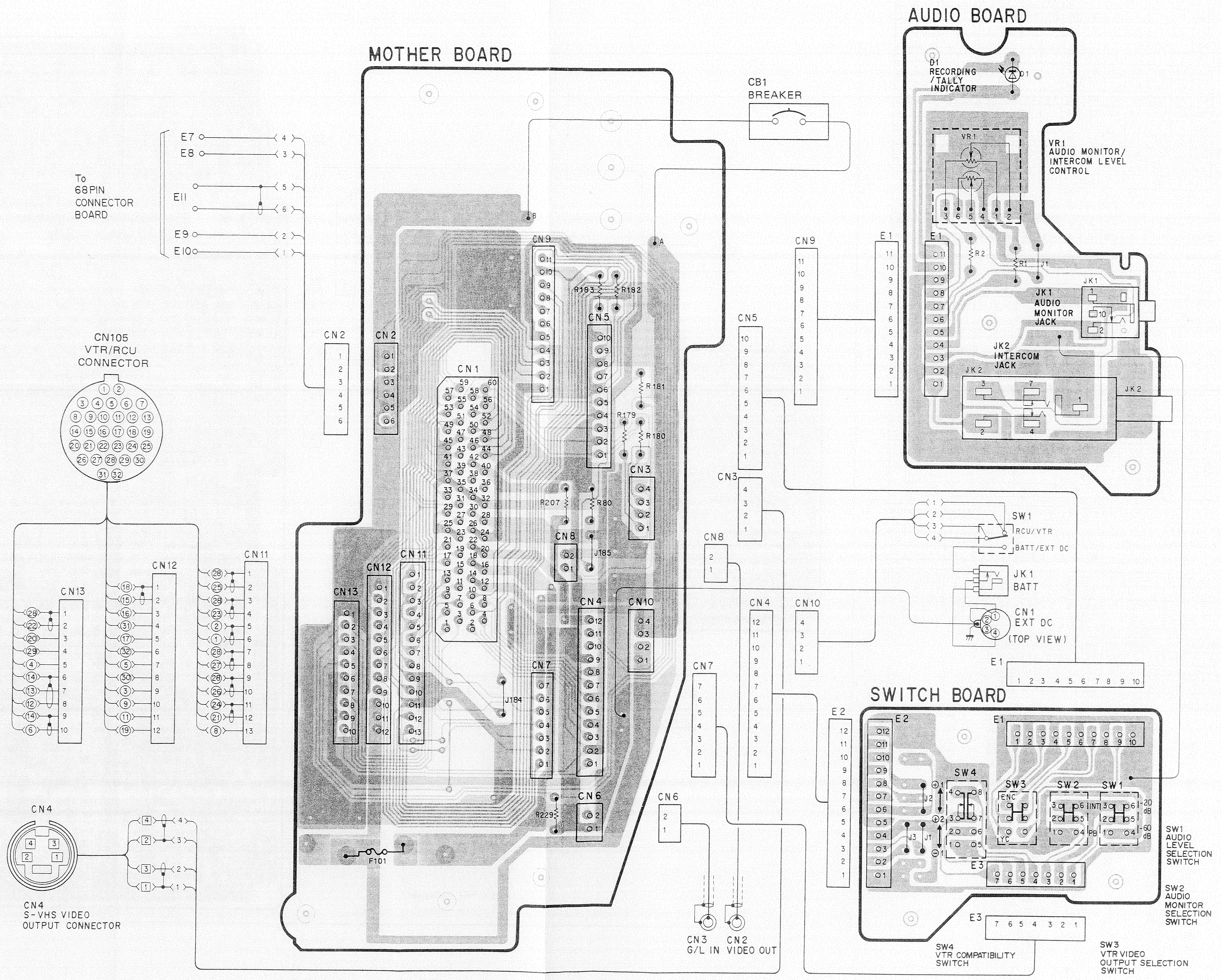
IC1	E5	IC26	C5	Q17	D4	Q40	B6
IC2	E5	IC27	C4	Q18	A4	Q44	C7
IC3	E5	IC28	A5	Q19	B4	Q45	C7
IC4	E5	IC29	A6	Q20	B4	Q46	C7
IC5	F5	IC30	B5	Q21	D5	Q47	B7
IC6	F5	IC31	A6	Q22	D5	Q51	D4
IC7	F6	IC32	B6	Q23	D5	Q52	F4
IC8	E6	IC33	A6	Q24	D5	D1	C6
IC9	D6	Q1	F5	Q25	D5	D2	B4
IC10	A4	Q2	E5	Q26	D5	D3	B4
IC11	B4	Q3	E5	Q27	D4	D4	A6
IC12	C6	Q4	E5	Q28	D4	D6	B5
IC13	D5	Q5	E5	Q29	B5	D7	E7
IC14	D6	Q6	E5	Q30	A5		
IC15	D5	Q7	E5	Q31	A5		
IC16	D5	Q8	F5	Q32	A5		
IC17	D6	Q9	F4	Q33	B6		
IC18	D5	Q10	E5	Q34	A6		
IC19	D5	Q11	E4	Q35	A5		
IC20	C5	Q12	E5	Q36	A5		
IC21	C4	Q13	E4	Q37	A5		
IC22	C4	Q14	E7	Q38	B6		
IC24	B5	Q15	D7	Q39	A6		
IC25	C5	Q16	D6				



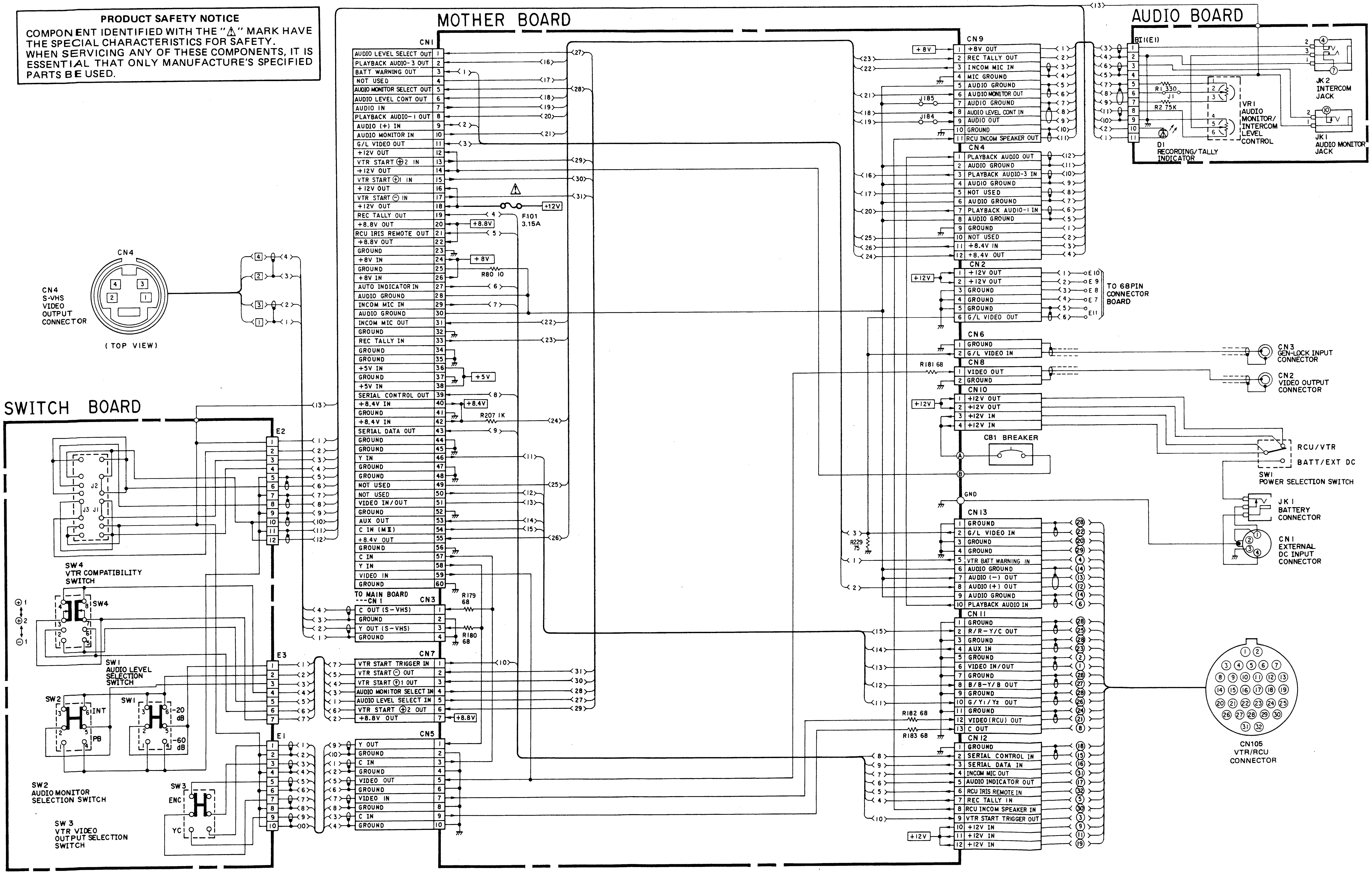
CONDUCTOR VIEW OF MOTHER BOARD FOR CAMERA ADAPTOR


AUDIO BOARD
D1 RECORDING /TALLY INDICATOR
D1
VR1 AUDIO MONITOR/ INTERCOM LEVEL CONTROL
VR1
E1
R2
R1
J1
JK1
JK1 AUDIO MONITOR JACK
JK2 INTERCOM JACK
JK2
MOTHER BOARD
CB1 BREAKER
To 68PIN CONNECTOR BOARD
E7
E8
E11
E9
E10
CN2
CN9
CN5
CN1
CN3
CN8
CN4
CN10
CN7
CN6
CN11
CN12
CN13
R183
R182
R181
R179
R180
R207
R80
J185
J184
R229
F101
CN105 VTR/RCU CONNECTOR
CN4 S-VHS VIDEO OUTPUT CONNECTOR
CN3 G/L IN
CN2 VIDEO OUT
SW1
RCU/VTR
BATT/EXT DC
JK1 BATT
CN1 EXT DC (TOP VIEW)
SWITCH BOARD
E2
E3
SW4
SW3
SW2
ENC
YC
INT
PB
-20 dB
-60 dB
J2
J3
SW1 AUDIO LEVEL SELECTION SWITCH
SW2 AUDIO MONITOR SELECTION SWITCH
SW3 VTR VIDEO OUTPUT SELECTION SWITCH
SW4 VTR COMPATIBILITY SWITCH

SCHEMATIC DIAGRAM OF MOTHER BOARD FOR CAMERA ADAPTOR

PRODUCT SAFETY NOTICE

COMPONENT IDENTIFIED WITH THE "⚠" MARK HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN SERVICING ANY OF THESE COMPONENTS, IT IS ESSENTIAL THAT ONLY MANUFACTURE'S SPECIFIED PARTS BE USED.


MOTHER BOARD
CN1
1 AUDIO LEVEL SELECT OUT
2 PLAYBACK AUDIO-3 OUT
3 BATT WARNING OUT
4 NOT USED
5 AUDIO MONITOR SELECT OUT
6 AUDIO LEVEL CONT OUT
7 AUDIO IN
8 PLAYBACK AUDIO-1 OUT
9 AUDIO (+) IN
10 AUDIO MONITOR IN
11 G/L VIDEO OUT
12 +12V OUT
13 VTR START ⊕2 IN
14 +12V OUT
15 VTR START ⊕1 IN
16 +12V OUT
17 VTR START ⊖ IN
18 +12V OUT
19 REC TALLY OUT
20 +8.8V OUT
21 RCU IRIS REMOTE OUT
22 +8.8V OUT
23 GROUND
24 +8V IN
25 GROUND
26 +8V IN
27 AUTO INDICATOR IN
28 AUDIO GROUND
29 INCOM MIC IN
30 AUDIO GROUND
31 INCOM MIC OUT
32 GROUND
33 REC TALLY IN
34 GROUND
35 GROUND
36 +5V IN
37 GROUND
38 +5V IN
39 SERIAL CONTROL OUT
40 +8.4V IN
41 GROUND
42 +8.4V IN
43 SERIAL DATA OUT
44 GROUND
45 GROUND
46 Y IN
47 GROUND
48 GROUND
49 NOT USED
50 NOT USED
51 VIDEO IN/OUT
52 GROUND
53 AUX OUT
54 C IN (MII)
55 +8.4V OUT
56 GROUND
57 C IN
58 Y IN
59 VIDEO IN
60 GROUND
⚠
F101 3.15A
+12V
+8.8V
+8V
R80 10
+5V
+8.4V
R207 1K
TO MAIN BOARD ---CN1
CN3
1 C OUT (S-VHS)
2 GROUND
3 Y OUT (S-VHS)
4 GROUND
R179 68
R180 68
CN7
1 VTR START TRIGGER IN
2 VTR START ⊖ OUT
3 VTR START ⊕1 OUT
4 AUDIO MONITOR SELECT IN
5 AUDIO LEVEL SELECT IN
6 VTR START ⊕2 OUT
7 +8.8V OUT
CN5
1 Y OUT
2 GROUND
3 C IN
4 GROUND
5 VIDEO OUT
6 GROUND
7 VIDEO IN
8 GROUND
9 C IN
10 GROUND
CN9
1 +8V OUT
2 REC TALLY OUT
3 INCOM MIC IN
4 MIC GROUND
5 AUDIO GROUND
6 AUDIO MONITOR OUT
7 AUDIO GROUND
8 AUDIO LEVEL CONT IN
9 AUDIO OUT
10 GROUND
11 RCU INCOM SPEAKER OUT
J185
J184
CN4
1 PLAYBACK AUDIO OUT
2 AUDIO GROUND
3 PLAYBACK AUDIO-3 IN
4 AUDIO GROUND
5 NOT USED
6 AUDIO GROUND
7 PLAYBACK AUDIO-1 IN
8 AUDIO GROUND
9 GROUND
10 NOT USED
11 +8.4V IN
12 +8.4V OUT
CN2
1 +12V OUT
2 +12V OUT
3 GROUND
4 GROUND
5 GROUND
6 G/L VIDEO OUT
E10
E9
E8
E7
E11
TO 68PIN CONNECTOR BOARD
CN6
1 GROUND
2 G/L VIDEO IN
R181 68
CN8
1 VIDEO OUT
2 GROUND
CN10
1 +12V OUT
2 +12V OUT
3 +12V IN
4 +12V IN
CB1 BREAKER
A
B
GND
CN13
1 GROUND
2 G/L VIDEO IN
3 GROUND
4 GROUND
5 VTR BATT WARNING IN
6 AUDIO GROUND
7 AUDIO (-) OUT
8 AUDIO (+) OUT
9 AUDIO GROUND
10 PLAYBACK AUDIO IN
R229 75
CN11
1 GROUND
2 R/R-Y/C OUT
3 GROUND
4 AUX IN
5 GROUND
6 VIDEO IN/OUT
7 GROUND
8 B/B-Y/B OUT
9 GROUND
10 G/Y1/Y2 OUT
11 GROUND
12 VIDEO (RCU) OUT
13 C OUT
R182 68
R183 68
CN12
1 GROUND
2 SERIAL CONTROL IN
3 SERIAL DATA IN
4 INCOM MIC OUT
5 AUDIO INDICATOR OUT
6 RCU IRIS REMOTE IN
7 REC TALLY IN
8 RCU INCOM SPEAKER IN
9 VTR START TRIGGER OUT
10 +12V IN
11 +12V IN
12 +12V IN
AUDIO BOARD
BT1(E1)
R1 330
J1
R2 75K
VR1 AUDIO MONITOR/INTERCOM LEVEL CONTROL
D1 RECORDING/TALLY INDICATOR
JK2 INTERCOM JACK
JK1 AUDIO MONITOR JACK
CN3 GEN-LOCK INPUT CONNECTOR
CN2 VIDEO OUTPUT CONNECTOR
RCU/VTR
BATT/EXT DC
SW1 POWER SELECTION SWITCH
JK1 BATTERY CONNECTOR
CN1 EXTERNAL DC INPUT CONNECTOR
CN105 VTR/RCU CONNECTOR
CN4
CN4 S-VHS VIDEO OUTPUT CONNECTOR
(TOP VIEW)
SWITCH BOARD
E2
J2
J3
J1
SW4 VTR COMPATIBILITY SWITCH
SW4
E3
SW1 AUDIO LEVEL SELECTION SWITCH
SW2
INT
PB
SW1
-20 dB
-60 dB
E1
SW2 AUDIO MONITOR SELECTION SWITCH
SW3
ENC
YC
SW 3 VTR VIDEO OUTPUT SELECTION SWITCH

SCHEMATIC DIAGRAM OF SERVO CONTROL ZOOM LENS WV-LZ70/12

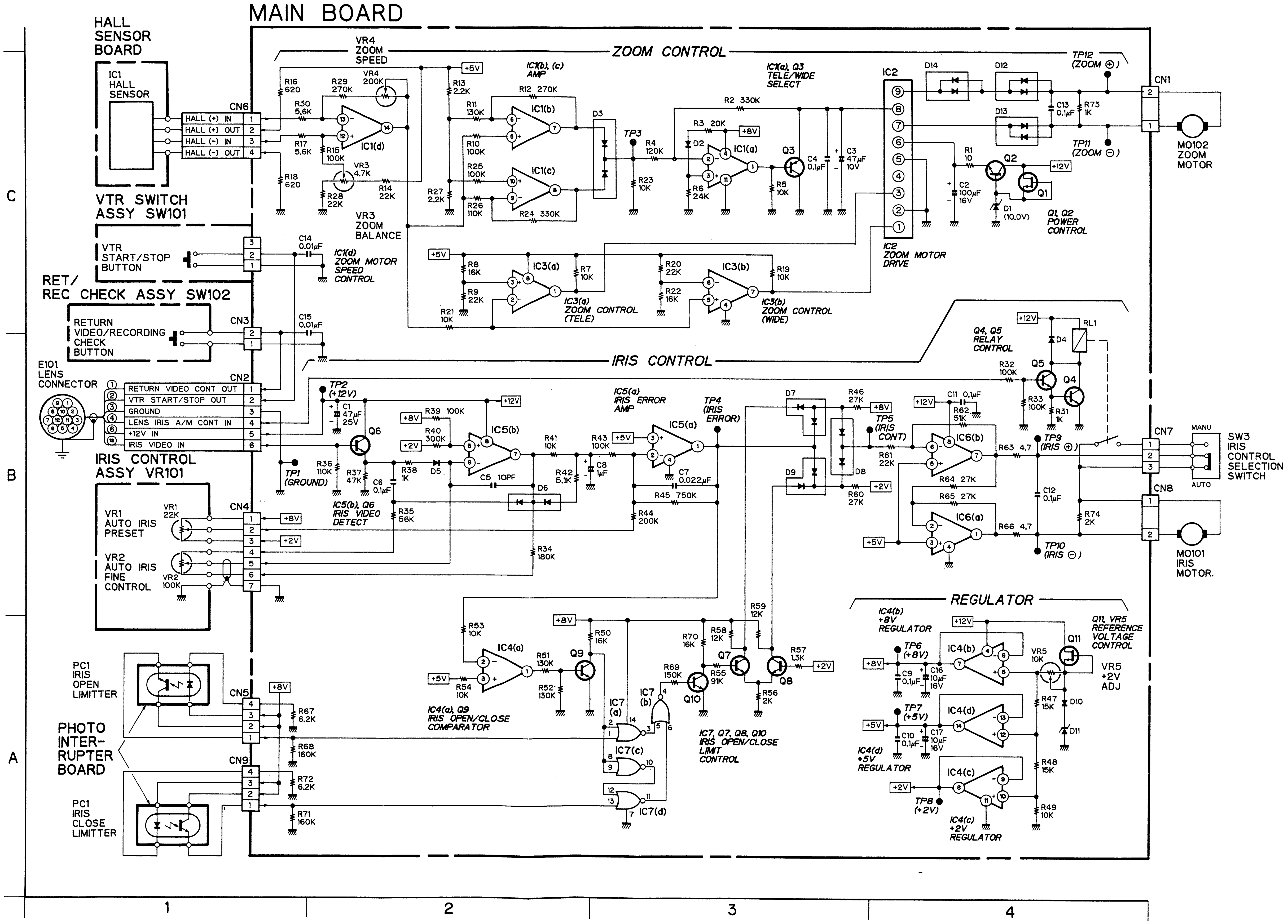
<Voltages>

	IC1	IC2	IC3	IC4	IC5	IC6	IC7
Pin 1	0.6	3.4	3.4	-	5.0	5.1	7.8
2	4.8	0	2.6	5.0	5.0	5.0	3.3
3	4.1	3.4	2.9	5.0	5.0	5.0	0
4	8.0	0	0	12.0	0	0	8.0
5	0.2	0	2.6	8.0	6.4	5.0	0
6	3.8	8.8	2.1	8.0	6.5	5.0	0
7	6.7	1.3	3.4	8.0	6.3	5.0	0
8	2.3	1.3	5.0	2.0	12.0	12.0	-
9	2.5	1.3		2.0			-
10	2.5			2.0			-
11	0			0			0
12	2.5			5.0			-
13	2.5			5.0			7.8
14	2.5			5.0			8.0
15							
16							

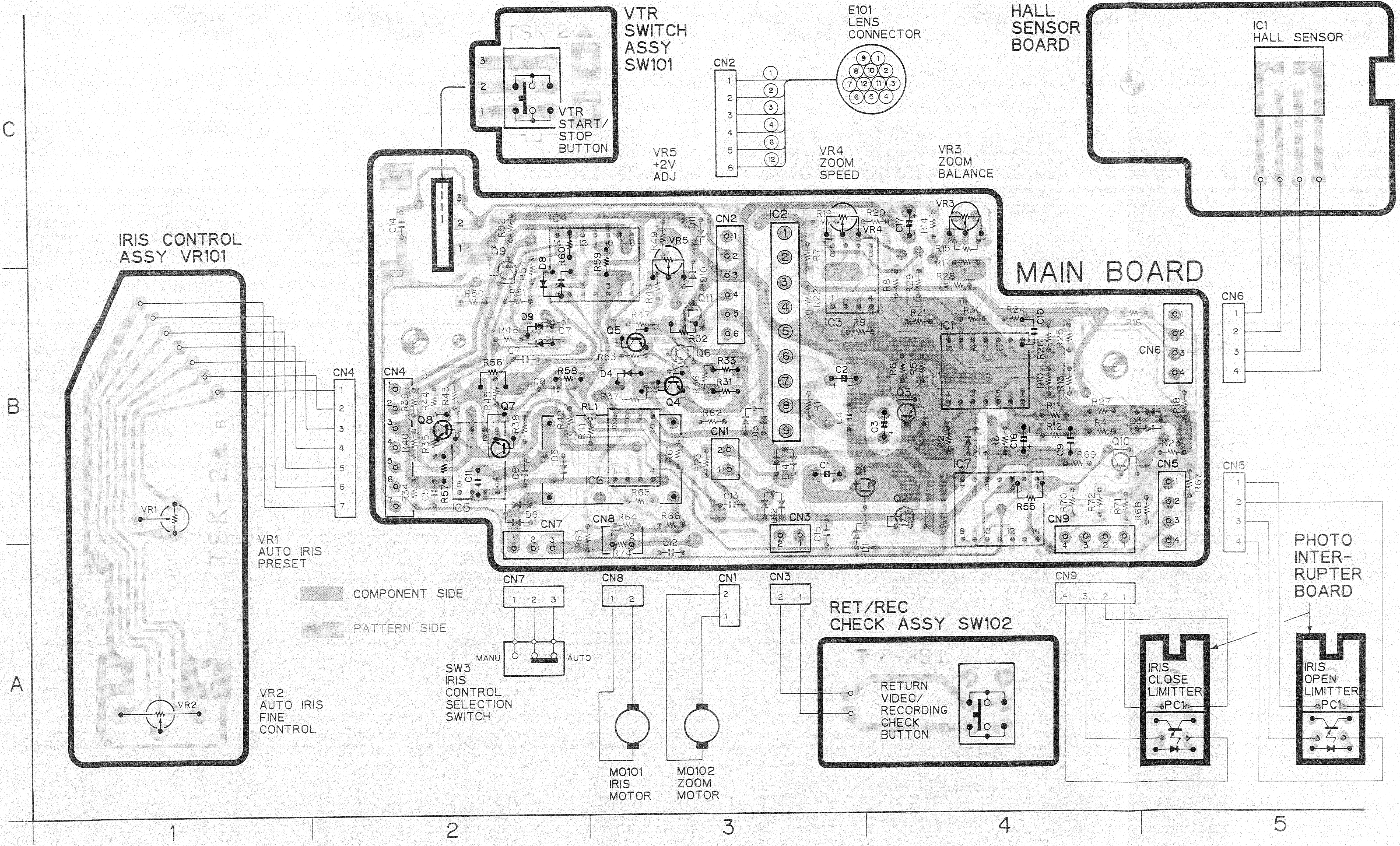
	B	C	E
Q1	^{G}9.8	^{D}12.0	^{S}9.8
Q2	9.8	12.0	9.2
Q3	0.6	0	1.3
Q4	0	12.0	0
Q5	0	12.0	0
Q6	3.9	12.0	3.4
Q7	0	8.0	1.3
Q7	^{G}8.9	^{D}12.0	^{S}8.9
Q8	1.9	1.3	1.3
Q9	0.4	-	0
Q10	0.6	0	0

<Index>

IC1	C2
IC2	C4
IC3	C2, C3
IC4	A2, A4
IC5	B2, B3
IC6	B4
IC7	A3
Q1	C4
Q2	C4
Q3	C3
Q4	B4
Q5	B4
Q6	B2
Q7	A3
Q8	A3
Q9	A2
Q10	A3
D1	C4
D2	C3
D3	C3
D4	B2
D5	B2
D6	B2
D7	B3
D8	B3
D9	B3
D10	A4
D11	A4
D12	C4
D13	C4
D14	C4


MAIN BOARD
HALL SENSOR BOARD
IC1 HALL SENSOR
CN6
HALL (+) IN
HALL (+) OUT
HALL (-) IN
HALL (-) OUT
VTR SWITCH ASSY SW101
VTR START/STOP BUTTON
RET/ REC CHECK ASSY SW102
RETURN VIDEO/RECORDING CHECK BUTTON
CN3
E101 LENS CONNECTOR
CN2
RETURN VIDEO CONT OUT
VTR START/STOP OUT
GROUND
LENS IRIS A/M CONT IN
+12V IN
IRIS VIDEO IN
IRIS CONTROL ASSY VR101
VR1 AUTO IRIS PRESET
VR1 22K
VR2 AUTO IRIS FINE CONTROL
VR2 100K
CN4
PHOTO INTER-RUPTER BOARD
PC1 IRIS OPEN LIMITTER
PC1 IRIS CLOSE LIMITTER
CN5
CN9
ZOOM CONTROL
VR4 ZOOM SPEED
VR3 ZOOM BALANCE
IC1(d) ZOOM MOTOR SPEED CONTROL
IC1(b), (c) AMP
IC1(a), Q3 TELE/WIDE SELECT
IC2
IC2 ZOOM MOTOR DRIVE
IC3(a) ZOOM CONTROL (TELE)
IC3(b) ZOOM CONTROL (WIDE)
Q1, Q2 POWER CONTROL
TP12 (ZOOM ⊕)
TP11 (ZOOM ⊖)
CN1
M0102 ZOOM MOTOR
IRIS CONTROL
Q4, Q5 RELAY CONTROL
RL1
IC5(a) IRIS ERROR AMP
TP4 (IRIS ERROR)
IC5(b), Q6 IRIS VIDEO DETECT
TP1 (GROUND)
TP2 (+12V)
TP5 (IRIS CONT)
TP9 (IRIS ⊕)
TP10 (IRIS ⊖)
CN7
CN8
MANU
AUTO
SW3 IRIS CONTROL SELECTION SWITCH
M0101 IRIS MOTOR.
IC4(a), Q9 IRIS OPEN/CLOSE COMPARATOR
IC7, Q7, Q8, Q10 IRIS OPEN/CLOSE LIMIT CONTROL
REGULATOR
IC4(b) +8V REGULATOR
IC4(d) +5V REGULATOR
IC4(c) +2V REGULATOR
Q11, VR5 REFERENCE VOLTAGE CONTROL
VR5 +2V ADJ
TP6 (+8V)
TP7 (+5V)
TP8 (+2V)
A
B
C
1
2
3
4

CONDUCTOR VIEW OF SERVO CONTROL ZOOM LENS WV-LZ70/12


VTR SWITCH ASSY SW101
TSK-2
VTR START/ STOP BUTTON
E101 LENS CONNECTOR
CN2
HALL SENSOR BOARD
IC1 HALL SENSOR
VR5 +2V ADJ
VR4 ZOOM SPEED
VR3 ZOOM BALANCE
MAIN BOARD
IRIS CONTROL ASSY VR101
CN4
CN6
CN5
VR1 AUTO IRIS PRESET
VR2 AUTO IRIS FINE CONTROL
COMPONENT SIDE
PATTERN SIDE
CN7
CN8
CN1
CN3
CN9
MANU
AUTO
SW3 IRIS CONTROL SELECTION SWITCH
M0101 IRIS MOTOR
M0102 ZOOM MOTOR
RET/REC CHECK ASSY SW102
RETURN VIDEO/ RECORDING CHECK BUTTON
PHOTO INTER-RUPTER BOARD
IRIS CLOSE LIMITTER PC1
IRIS OPEN LIMITTER PC1
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IC3	B3
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IC5	B2
IC6	B3
IC7	B4
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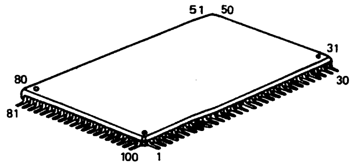
Q2	B4
Q3	B4
Q4	B3
Q5	B3
Q6	B3
Q7	B2
Q8	B2
Q9	C2
Q10	B4
D1	B3
D2	B4
D3	B5
D4	B3
D5	B2
D6	A2
D7	B2
D8	B2
D9	B2
D10	B3
D11	C3
D12	B3
D13	B3
D14	B3

APEARANCE OF IC, TRANSISTOR AND DIODE

YWMB87075A



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31
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80
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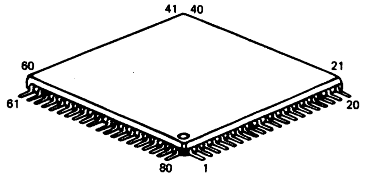

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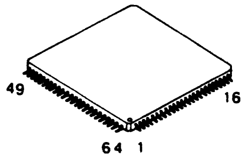

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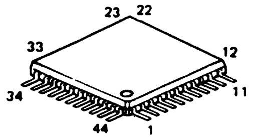

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34
11
44 1

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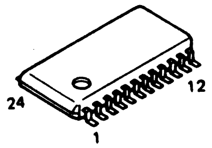

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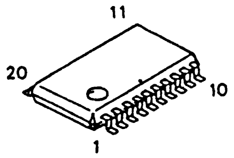

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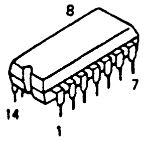

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NJU4051BM
YWNJU4538BM
MN4049BS
MN4050BS
MN4516BS

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YWTL1451CNS
UPD6142G-101
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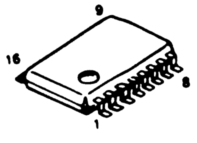
MN4053BS



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MN4073BS
MN74HC08S
MN74HC74S
MN74HC4066S
MN4023BS
MN4071BS

MN4011BS
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YWNJU4093BM
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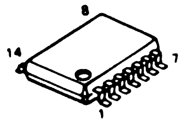
MN4001BS



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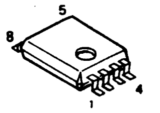

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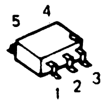

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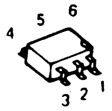

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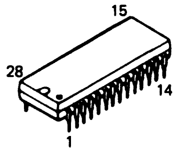

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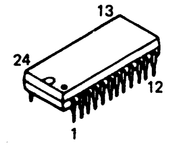

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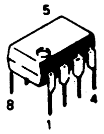

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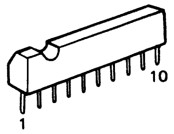

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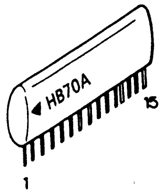

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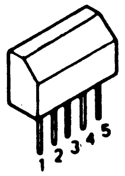

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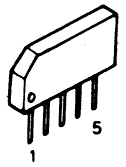
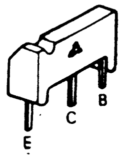


2SD973-QRS
2SD973A-RS
2SB793-RS
2SB793A-RS



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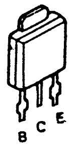

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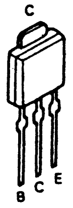

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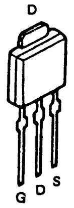

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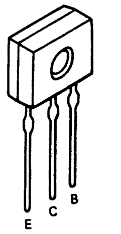
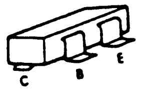


2SA1034-ST
2SA1462
2SA1531-ST
2SB709-RS
2SB766A-QR
2SB1218-QRS
2SB710-QRS
2SC3929-RS

2SC3735
2SC2404-CD
2SC2405ST
2SC3931-CD
2SD601-RS
2SD602-QRS
2SD1819-QRS
2SD601A-QR



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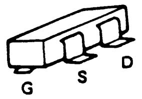
2SK662-PQR
2SK160-K6



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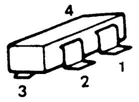
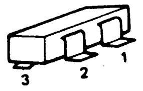


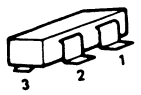
1 : Substrate
2 : Gate
3 : Source
4 : Drain

MA157



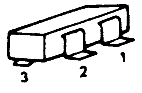
1 : Cathode
2 : Anode
3 : Common

MA151K
MA141K



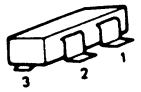
1 : NC
2 : Anode
3 : Cathode

MA151WK
MA141WK



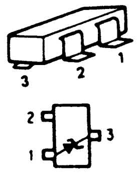
1 : Anode
2 : Anode
3 : Cathode

MA151WA
MA141WA



1 : Cathode
2 : Cathode
3 : Anode

MA3100-L
MA3082-M



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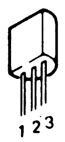

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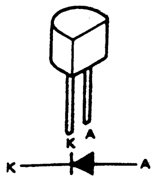

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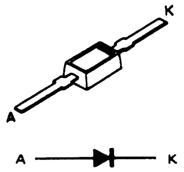
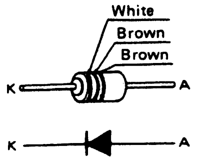
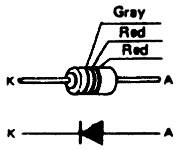


MA4091M



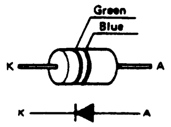
White
Brown
Brown
K
A
K
A

MA4082M



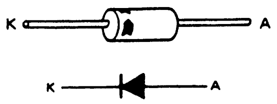
Grey
Red
Red
K
A
K
A

1SS97-2

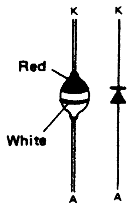


Green
Blue
K
A
K
A

YWERA81004

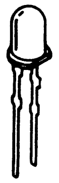


V03G



K
K
Red
White
A
A

LN11WP23



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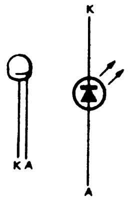

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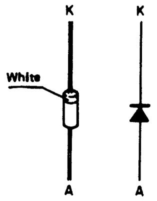

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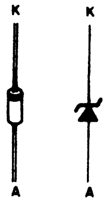

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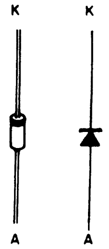

Service Manual

PAL Colour Video Camera

WV-F70E Series

Vol. 4

Replacement Parts List
Exploded View

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REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

CAMERA HEAD

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
SW101	YWMTK7211G2	Power Switch
JK101	YWYAE329800A	Jack
F1 ⚠	XBA2C50ET0A	Current Fuse 5A 250V
CN101	31-10T	BNC Connector
CN102	HR10A10R12SB	Lens Connector
CN103	YWDB201N624	Viewfinder Connector
CN104	YWD7110N100	Microphone Connector
CN106	YW14803493	Power Connector for Male(Orange)
CN107	YW14803500	Power Connector for Female(White)
E101	YFV0009-005B	DC Cable Assy
E102	YFFH-B02	Fuse Holder
E105	YW606175	Connector pin for Male
E106	YW606185	Connector pin for Female
M1	YWV5EA0692A1	Front Cover
M2	YWV4JA0284A4	Spring A
M3	YWV0EA0073AN	Lens Mount Assy
M4	YWV0EA0072AN	Filter Assy
M5	YWV2SA1397A4	Mounting Angle
M6	YWV0EA0069AN	CCD Assy
M7	YWV2HA0704A3	Shield Parts
M8	YWV2CA0276A4	Hold Plate for Ferrite
M9	YWV6JA0041A4	VTR Button
M10	YWV2HA0703A3	Shield Plate
M11	YFV2NA0053B4	Spacer
M12	YFV1KA0030A4	Washer
M13	YWV1HA0045A4	Pin
M14	YW2VNA0275A4	Spacer B
M15	YWV7SA0989A4	Board Caution Label
M16	YWNK8N	Cord Clamp
M17	YWV2SA1398A3	Mounting Angle for Switch
M20	YWV7SA0976A2	Decoration Label
M21	YWV5EA0693A1	Cover
M22	YWV5EA0697A1	Cover
M23	YWV2EA0110A2	Guide
M24	YWV2SA1400A4	Mounting Angle
M25	YWV5MA0030A4	Shoe
M26	YWV2CA0278A4	Ferrite Cover A
M27	YWV2CA0279A4	Ferrite Cover B
M28	YFV7MA0099A4	Safety Label
M29	YWV6GA0128A4	Blank Plate
M30	YWV5EA0694A1	Rear Cover
M31	YWV2EA0111A2	Guide
M32	YWV2SB1400A4	Mounting Angle
M33	YWV2SA1407A4	Mounting Angle
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M35	YWV3CA0175A3	Parts Holder
M36	YWV6JB0056A4	Push Button for VTR Lock
M37	YWV6GA0127A4	Push Plate
M38	YWV1HA0036A4	Guide Pin
M39	YWV2SA1432A4	Mounting Angle
M40	YWV2NA0273A4	Spacer C for BNC Connector
M41	YWV5EA0695A1	Left Side Cover
M42	YWV7PA0070A4	Badge
M43	YWV7QA1874A3	Control Label
M44	YWV2FA0417B4	Push Cushion for Board
M46	YWV2VA0030A4	Barrier
M48	YWV5RA0249A4	Switch Knob
M49	YFV6JA0026A4	Push Button
M51	YWV5EA0696A1	Right Side Cover
M52	YWV5VA0056A2	Pad
M53	YWV7QA1873A3	Sets Label
M54	YWV6EA0107B2	Lid
M55	YWV5EA0698A3	Filter Cover
M56	YWV5EA0699A3	Filter Case
M57	YWV4JA0156B4	Spring
M58	YWV2HA0737A4	Shield Parts
M59	YWV2VA0029A3	Barrier
M91	YWV6AA0021A1	Handle Grip
M92	YWV5EA0704A2	Cover
M93	YWV1EA0149A4	Special Screw
M94	YWV1EA0148A4	Special Screw
M95	YWV1KA0039A4	Washer
M96	YWV4JA0152A4	Spring
M97	YWFAC17XWB1	Spring
M98	YFV5MA0002B4	Shoe
M100	YWFAC17XFM2	Special Screw
M101	YWV1EA0147A4	Special Screw
M105	YWV5EA0700A1	Bottom Cover
M106	YWV5VA0057A1	Pad
M107	YWV5WA0931A3	Panel
M108	YWV6GA0060B4	Plate
M109	YWV2SA1403A4	Mounting Angle
M110	YWSR2P4	Cord Clamp
M111	YWV5WA0949A4	Panel
M112	YWV7MA0223A4	Fuse Label

AWC/ABC BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB1 (NLA)	YWVKZF70HE2A	Printed Circuit Board Assy
R1	ERDS2TJ561	Carbon 560 ohms 1/4W
SW1	YWMAP312C	Toggle Switch
SW2	YWMAP312G	Toggle Switch
CN1	EMCS0250ZL	2-pin Connector

REC BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB2	YWVRZF70HE3A	Printed Board
SW1	YWSKHGAA	Push Switch

SIDE SWITCH BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB3 (NLA)	YWVKYF70HE2A	Printed Circuit Board Assy
D1-4	MA165	Diode
R1,2	ERDS2TJ102	Carbon 1K ohms 1/4W
R3,4	ERDS2TJ333	Carbon 33K ohms 1/4W
R5	ERDS2TJ102	Carbon 1K ohms 1/4W
SW2,3	YWMAP312C	Toggle Switch
SW4	YWMAP312B	Toggle Switch
CN1	EMCS0650Z	6-pin Connector

PREAMP/DRIVE BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB4 (NLA)	YWVKBF70HE2A	Printed Circuit Board Assy
IC1	MN4053BS	IC
IC2	NJM2904M	IC
IC3	YWCX10047	IC
IC4	YWTC4S66FR	IC
IC5	YWTC4S69F	IC
IC101,102	YWUPD6147G	IC
IC103	MN5108	IC
IC104	MN53010LVN	IC
IC105	MN74HC08S	IC
IC106	NJU74HCU04M	IC
IC107	YWUPC4062G2	IC
IC108	NJM2904M	IC
IC301	MN74HC4066S	IC
Q1	2SD601-RS	Transistor
Q2	2SB709-RS	Transistor
Q3,4	2SD601-RS	Transistor
Q5	2SC2404-CD	Transistor
Q6,7	2SB709-RS	Transistor
Q8	2SD601-RS	Transistor
Q9	2SC2405ST	Transistor
Q10	2SD601-RS	Transistor
Q11,12	2SB709-RS	Transistor
Q13	2SD601-RS	Transistor
Q14	2SB709-RS	Transistor
Q15,16	2SD601-RS	Transistor
Q17	2SC2405ST	Transistor
Q22	2SD601-RS	Transistor
Q23	2SC2404-CD	Transistor
Q24,25	2SD601-RS	Transistor
Q26,27	2SB709-RS	Transistor
Q101	2SA1462	Transistor
Q102	2SC3735	Transistor
Q103	2SA1462	Transistor
Q104	2SC3735	Transistor
Q105	2SA1462	Transistor
Q106	2SC3735	Transistor
Q107	2SA1462	Transistor
Q108	2SC3735	Transistor
Q109	2SA1462	Transistor
Q110	2SC3735	Transistor
Q111-115	2SD601-RS	Transistor
Q116	2SD602-QRS	Transistor
Q117	2SD973A-RS	Transistor
Q118,119	2SD601-RS	Transistor
Q120	2SB709-RS	Transistor
Q121	2SK198-Q	Transistor
Q122	2SD973A-RS	Transistor
Q123	2SB709-RS	Transistor
Q124	2SB793A-RS	Transistor
Q125	2SD601-RS	Transistor
Q126	2SB709-RS	Transistor
Q127	2SD973A-RS	Transistor
Q128	2SD601-RS	Transistor
Q129	2SB793A-RS	Transistor
Q301	2SB709-RS	Transistor
Q302	3SK157	FET
Q303	2SC2404-CD	Transistor
Q304	2SB709-RS	Transistor
Q305	3SK157	FET
Q306	2SC2404-CD	Transistor
Q307	2SB709-RS	Transistor
Q308	3SK157	FET
Q309	2SC2404-CD	Transistor
Q310-313	2SD601-RS	Transistor
Q314,315	2SB709-RS	Transistor
Q316-320	2SD601-RS	Transistor
Q321,322	2SK198-Q	Transistor
Q323	2SC2404-CD	Transistor
Q324	2SK198-Q	Transistor
Q325	2SC2404-CD	Transistor
Q326	2SK198-Q	Transistor
Q327	2SC2404-CD	Transistor
Q328	2SD601-RS	Transistor
Q329	2SB709-RS	Transistor
Q330	2SD601-RS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q331	2SB709-RS	Transistor	
Q332	2SD601-RS	Transistor	
Q333	2SB709-RS	Transistor	
Q334	2SD601-RS	Transistor	
D1,101	MA151K	Diode	
D102-111	MA151K	Diode	
D112,113	1SV153	Diode	
D114	MA151K	Diode	
R1	YF2116104JT	Carbon	100K ohms 1/16W
R2	YF2116101JT	Carbon	100 ohms 1/16W
R3	YF2116223JT	Carbon	22K ohms 1/16W
R4	YF2116272JT	Carbon	2.7K ohms 1/16W
R5	YWR1220P332D	Metal	3.3K ohms
R6	YF2116152JT	Carbon	1.5K ohms 1/16W
R7	YWR1220P332D	Metal	3.3K ohms
R8	YF2116472GT	Carbon	4.7K ohms 1/16W
R10	YF2116101JT	Carbon	100 ohms 1/16W
R11	YF2116333GT	Carbon	33K ohms 1/16W
R12	YF2116332JT	Carbon	3.3K ohms 1/16W
R13	YF2116163JT	Carbon	16K ohms 1/16W
R14	YF2116102GT	Carbon	1K ohms 1/16W
R15	YF2116222GT	Carbon	2.2K ohms 1/16W
R16	YF2116223JT	Carbon	22K ohms 1/16W
R17	YF2116682JT	Carbon	6.8K ohms 1/16W
R18	YF2116103JT	Carbon	10K ohms 1/16W
R19	YF2116101JT	Carbon	100 ohms 1/16W
R20	YF2116682JT	Carbon	6.8K ohms 1/16W
R21	YF2116222GT	Carbon	2.2K ohms 1/16W
R22	YF2116332JT	Carbon	3.3K ohms 1/16W
R23,24	YWR1220P332D	Metal	3.3K ohms
R25	YWR1220P182D	Metal	1.8K ohms
R26	R1220P621D	Metal	620 ohms
R27	YF2116473GT	Carbon	47K ohms 1/16W
R28	YF2116334JT	Carbon	330K 1/16W
R29	YF2116473GT	Carbon	47K ohms 1/16W
R30	YF2116334JT	Carbon	330K 1/16W
R31	YF2116562JT	Carbon	5.6K ohms 1/16W
R32	YF2116101JT	Carbon	100 ohms 1/16W
R33	YF2116103JT	Carbon	10K ohms 1/16W
R34	YF2116102GT	Carbon	1K ohms 1/16W
R35	YF2116821GT	Carbon	820 ohms 1/16W
R36	YF2116102GT	Carbon	1K ohms 1/16W
R37	YF2116332JT	Carbon	3.3K ohms 1/16W
R38	YF2116103JT	Carbon	10K ohms 1/16W
R39	YF2116472GT	Carbon	4.7K ohms 1/16W
R40,42	YF2116222GT	Carbon	2.2K ohms 1/16W
R43-45	YF2116222GT	Carbon	2.2K ohms 1/16W
R46	YF2116101JT	Carbon	100 ohms 1/16W
R47	YF2116334JT	Carbon	330K 1/16W
R48	YF2116473GT	Carbon	47K ohms 1/16W
R49,50	YF2116103JT	Carbon	10K ohms 1/16W
R51	YF2116562JT	Carbon	5.6K ohms 1/16W
R52,53	YF2116332JT	Carbon	3.3K ohms 1/16W
R54	YF2116103JT	Carbon	10K ohms 1/16W
R55	YF2116332JT	Carbon	3.3K ohms 1/16W
R56	YF2116334JT	Carbon	330K 1/16W
R57	YF2116473GT	Carbon	47K ohms 1/16W
R58	YF2116472GT	Carbon	4.7K ohms 1/16W
R59	YF2116223JT	Carbon	22K ohms 1/16W
R60	YF2116101JT	Carbon	100 ohms 1/16W
R61	YF2116152JT	Carbon	1.5K ohms 1/16W
R62	YF2116472GT	Carbon	4.7K ohms 1/16W
R63,64	YF2116103JT	Carbon	10K ohms 1/16W
R65	YF2116682JT	Carbon	6.8K ohms 1/16W
R67	YF2116102GT	Carbon	1K ohms 1/16W
R68	YF2116473GT	Carbon	47K ohms 1/16W
R69	YF2116104JT	Carbon	100K ohms 1/16W
R101,102	YF2116220JT	Carbon	22 ohms 1/16W
R105,111	YF2116220JT	Carbon	22 ohms 1/16W
R117	YF2116220JT	Carbon	22 ohms 1/16W
R131-138	YF2116330JT	Carbon	33 ohms 1/16W
R139	YF2116472GT	Carbon	4.7K ohms 1/16W
R140	YF2116203JT	Carbon	20K ohms 1/16W
R141	YF2116103JT	Carbon	10K ohms 1/16W
R142	YF2116472GT	Carbon	4.7K ohms 1/16W
R143	YF2116103JT	Carbon	10K ohms 1/16W
R144	YF2116203JT	Carbon	20K ohms 1/16W
R145-147	YF2116102GT	Carbon	1K ohms 1/16W
R148	YF2116472GT	Carbon	4.7K ohms 1/16W
R149	YF2116104JT	Carbon	100K ohms 1/16W
R151	YF2116153JT	Carbon	15K ohms 1/16W
R152	YF2116563JT	Carbon	56K ohms 1/16W
R153	YF2116393GT	Carbon	39K ohms 1/16W
R154	YF2116472GT	Carbon	4.7K ohms 1/16W
R155	YF2116104JT	Carbon	100K ohms 1/16W
R156	YF2116103JT	Carbon	10K ohms 1/16W
R157	YF2116102GT	Carbon	1K ohms 1/16W
R158,159	YF2116103JT	Carbon	10K ohms 1/16W
R162,163	YF2116103JT	Carbon	10K ohms 1/16W
R166	YF2116103JT	Carbon	10K ohms 1/16W
R167	YF2116511JT	Carbon	510 ohms 1/16W
R168	YF2116104JT	Carbon	100K ohms 1/16W
R169,170	YF2116101JT	Carbon	100 ohms 1/16W
R171	YF2116470JT	Carbon	47 ohms 1/16W
R172	YF2116101JT	Carbon	100 ohms 1/16W
R173	YF2116470JT	Carbon	47 ohms 1/16W
R174,175	YF2116104JT	Carbon	100K ohms 1/16W
R176-178	YF2116470JT	Carbon	47 ohms 1/16W
R179	YF2116104JT	Carbon	100K ohms 1/16W
R180	YF2116101JT	Carbon	100 ohms 1/16W
R181-183	YF2116102GT	Carbon	1K ohms 1/16W
R184	YF2116101JT	Carbon	100 ohms 1/16W
R185	YF2116471JT	Carbon	470 ohms 1/16W
R186,187	YF2116104JT	Carbon	100K ohms 1/16W
R190-193	YF2116221JT	Carbon	220 ohms 1/16W
R194	YF2116103JT	Carbon	10K ohms 1/16W
R195-197	YF2116102GT	Carbon	1K ohms 1/16W
R199	YF2116220JT	Carbon	22 ohms 1/16W
R200	YF2116223JT	Carbon	22K ohms 1/16W
R201	YF2116562JT	Carbon	5.6K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R202	YF2116102GT	Carbon	1K ohms 1/16W
R203	YW2116105JT	Carbon	1M ohms 1/16W
R204	YF2116102GT	Carbon	1K ohms 1/16W
R206,207	YF2116103JT	Carbon	10K ohms 1/16W
R208	YF2116102GT	Carbon	1K ohms 1/16W
R209	YF2116331JT	Carbon	330 ohms 1/16W
R210	YF2116102GT	Carbon	1K ohms 1/16W
R211	YWR1220P393D	Metal	39K ohms
R212	R1220P133D	Metal	13K ohms
R213	YWR1220P473D	Metal	47K ohms
R214	YWR1220P153D	Metal	15K ohms
R215	YF2116331JT	Carbon	330 ohms 1/16W
R216	YF2116102GT	Carbon	1K ohms 1/16W
R217	YWR1220P393D	Metal	39K ohms
R218	R1220P133D	Metal	13K ohms
R219	YWR1220P153D	Metal	15K ohms
R220	YWR1220P473D	Metal	47K ohms
R221	YF2116331JT	Carbon	330 ohms 1/16W
R222	YF2116102GT	Carbon	1K ohms 1/16W
R223	R1220P133D	Metal	13K ohms
R224	YWR1220P393D	Metal	39K ohms
R225	R1220P822D	Metal	8.2K ohms
R226	YWR1220P473D	Metal	47K ohms
R227	YF2116331JT	Carbon	330 ohms 1/16W
R228	YF2116102GT	Carbon	1K ohms 1/16W
R229	R1220P133D	Metal	13K ohms
R230	YWR1220P393D	Metal	39K ohms
R231	YWR1220P153D	Metal	15K ohms
R232	YWR1220P473D	Metal	47K ohms
R233,234	YF2116101JT	Carbon	100 ohms 1/16W
R242	YF2116101JT	Carbon	100 ohms 1/16W
R243	YF2116102GT	Carbon	1K ohms 1/16W
R302	YF2116473GT	Carbon	47K ohms 1/16W
R303	YF2116273GT	Carbon	27K ohms 1/16W
R304	YF2116472GT	Carbon	4.7K ohms 1/16W
R305	YF2116683GT	Carbon	68K ohms 1/16W
R306	YF2116473GT	Carbon	47K ohms 1/16W
R307	YF2116330JT	Carbon	33 ohms 1/16W
R309	YF2116153JT	Carbon	15K ohms 1/16W
R310	YW2116182JT	Carbon	1.8K ohms 1/16W
R311	YF2116823JT	Carbon	82K ohms 1/16W
R312	YF2116473GT	Carbon	47K ohms 1/16W
R313	YF2116330JT	Carbon	33 ohms 1/16W
R314	YF2116153JT	Carbon	15K ohms 1/16W
R316	YW2116182JT	Carbon	1.8K ohms 1/16W
R317	YF2116330JT	Carbon	33 ohms 1/16W
R318	YF2116153JT	Carbon	15K ohms 1/16W
R319	YWR1220P102D	Metal	1K ohms
R320	R1220P121D	Metal	120 ohms
R321	YF2116394JT	Carbon	390K ohms 1/16W
R322	YWR1220P471D	Metal	470 ohms
R323	R1220P151D	Metal	150 ohms
R324	YF2116102GT	Carbon	1K ohms 1/16W
R325	YWR1220P153D	Metal	15K ohms
R326	YWR1220P112D	Metal	1.1K ohms

REF.NO.	PART NO.	DESCRIPTION	
R327	YF2116682JT	Carbon	6.8K ohms 1/16W
R328	YF2116222GT	Carbon	2.2K ohms 1/16W
R329	YF2116102GT	Carbon	1K ohms 1/16W
R330	YF2116823JT	Carbon	82K ohms 1/16W
R331	YF2116102GT	Carbon	1K ohms 1/16W
R332	YF2116122JT	Carbon	1.2K ohms 1/16W
R333	YF2116102GT	Carbon	1K ohms 1/16W
R334	YF2116224JT	Carbon	220K ohms 1/16W
R335	YF2116682JT	Carbon	6.8K ohms 1/16W
R336	YF2116152JT	Carbon	1.5K ohms 1/16W
R337	YF2116221JT	Carbon	220 ohms 1/16W
R341	YF2116562JT	Carbon	5.6K ohms 1/16W
R342	YF2116681JT	Carbon	680 ohms 1/16W
R343-348	YF2116102GT	Carbon	1K ohms 1/16W
R349	YF2116152JT	Carbon	1.5K ohms 1/16W
R350	YF2116103JT	Carbon	10K ohms 1/16W
R351	YF2116273GT	Carbon	27K ohms 1/16W
R352	YF2116102GT	Carbon	1K ohms 1/16W
R353	YF2116101JT	Carbon	100 ohms 1/16W
R354	YF2116221JT	Carbon	220 ohms 1/16W
R355	YF2116102GT	Carbon	1K ohms 1/16W
R356	YF2116101JT	Carbon	100 ohms 1/16W
R357	YF2116222GT	Carbon	2.2K ohms 1/16W
R359,360	YF2116101JT	Carbon	100 ohms 1/16W
R361	YF2116221JT	Carbon	220 ohms 1/16W
R362,363	YF2116102GT	Carbon	1K ohms 1/16W
R364	YF2116101JT	Carbon	100 ohms 1/16W
R365	YF2116222GT	Carbon	2.2K ohms 1/16W
R367,368	YF2116101JT	Carbon	100 ohms 1/16W
R369	YF2116221JT	Carbon	220 ohms 1/16W
R370,371	YF2116102GT	Carbon	1K ohms 1/16W
R372	YF2116101JT	Carbon	100 ohms 1/16W
R373	YF2116222GT	Carbon	2.2K ohms 1/16W
R375	YF2116101JT	Carbon	100 ohms 1/16W
R376	YF2116472GT	Carbon	4.7K ohms 1/16W
VR1	EVML1GA00B15	Variable Resistor	100K ohms
VR2-5	EVML1GA00B23	Variable Resistor	2K ohms
VR6	EVML1GA00B15	Variable Resistor	100K ohms
VR7-9	EVML1GA00B53	Variable Resistor	5K ohms
VR10	EVML1GA00B25	Variable Resistor	200K ohms
VR101-104	EVML1GA00B15	Variable Resistor	100K ohms
VR301	EVML1GA00B12	Variable Resistor	100 ohms
C1	ECEA1AKS470	Electrolytic	47 µF 10V
C2	400040CHDT	Ceramic	4 pF
C4	ECEA1AKK100	Electrolytic	10 µF 6.3V
C5	ECST1CY105ZR	Electrolytic	1 µF 16V
C6	YF400150CHJT	Ceramic	15 pF
C7	ECEA1CKS470	Electrolytic	47 µF 16V
C8	ECEA1AKS470	Electrolytic	47 µF 10V
C9	YF400050CHDT	Ceramic	5 pF
C10	YF400104FZT	Ceramic	0.1 µF
C11	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C12	ECEA1AKS470	Electrolytic	47 µF 10V
C13	ECEA0GKS470	Electrolytic	47 µF 4V
C14	ECQM1H104JZ	Plastic	0.1 µF 50V

REF.NO.	PART NO.	DESCRIPTION	
C15-17	ECEA1AKS470	Electrolytic	47 µF 10V
C18,19	ECEA1CKS470	Electrolytic	47 µF 16V
C20	ECEA1ASN100	Electrolytic	10 µF 10V
C21	ECEA0GKS470	Electrolytic	47 µF 4V
C101	ECST1CD226ZR	Electrolytic	22 µF 16V
C102,103	YF400560CHJT	Ceramic	56 pF
C105	YF400104FZT	Ceramic	0.1 µF
C106,107	YF400560CHJT	Ceramic	56 pF
C109	YF400104FZT	Ceramic	0.1 µF
C110,111	YF400560CHJT	Ceramic	56 pF
C113	YF400104FZT	Ceramic	0.1 µF
C114,115	YF400560CHJT	Ceramic	56 pF
C117	YF400104FZT	Ceramic	0.1 µF
C118,119	YF400560CHJT	Ceramic	56 pF
C121	ECST1CD226ZR	Tantalum	22 µF 16V
C122,123	ECEA0GKS221	Electrolytic	220 µF 4V
C124	ECEA1AKA101	Electrolytic	100 µF 10V
C125	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C126	ECEA1AKS470	Electrolytic	47µF 10V
C127	ECEA1ES221	Electrolytic	220 µF 25V
C128,129	ECEA0GKS330	Electrolytic	33 µF 4V
C130	ECEA0JKS101	Electrolytic	100 µF 6.3V
C131-134	ECEA1CKK100	Electrolytic	10 µF 16V
C135	ECEA1CKA220	Electrolytic	22 µF 16V
C136	ECEA1EKA470	Electrolytic	47 µF 25V
C137	ECSF1CE106	Tantalum	10 µF 16V
C138	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C139	ECSF1CE106	Tantalum	10 µF 16V
C140	ECEA1CKS470	Electrolytic	47 µF 16V
C141	YF400104FZT	Ceramic	0.1 µF
C142	YF400150CHJT	Ceramic	15 pF
C143,144	YF400470CHJT	Ceramic	47 pF
C145,146	YF400104FZT	Ceramic	0.1 µF
C147,148	ECSF1AE476	Tantalum	47 µF 10V
C149,150	YF400470CHJT	Ceramic	47 pF
C151-153	YF400104FZT	Ceramic	0.1 µF
C154,155	ECSF1AE476	Tantalum	47 µF 10V
C156	ECST1AD226	Tantalum	22 µF 4V
C158	ECST1AD476ZR	Tantalum	47 µF 10V
C159	YF400100CHDT	Ceramic	10 pF
C160	ECST1AD226	Tantalum	22 µF 4V
C161,162	YF400120CHJT	Ceramic	12 pF CH
C163	ECEA1AKA101	Electrolytic	100 µF 10V
C165	ECEA0GKK220	Electrolytic	22 µF 4V
C168	ECEA0GKS221	Electrolytic	220 µF 4V
C169	ECEA0JK220	Electrolytic	22 µF 6.3V
C170	ECEA1EKA470	Electrolytic	47 µF 25V
C171	ECEA0JKS101	Electrolytic	100 µF 6.3V
C172	ECEA1AKA101	Electrolytic	100 µF 10V
C173	ECEA0GKK220	Electrolytic	22 µF 4V
C174	ECEA0JKS101	Electrolytic	100 µF 6.3V
C175	ECEA0GKK220	Electrolytic	22 µF 4V
C176	ECEA1CKA101	Electrolytic	100 µF 16V
C177	ECST1AD476ZR	Tantalum	47 µF 10V
C180	YF400100CHDT	Ceramic	10 pF
C301,302	YF400104FZT	Ceramic	0.1 µF
C303	YW5V1A335ZPT	Ceramic	3.3 µF
C304	YF400220CHJT	Ceramic	22 pF
C305	YF400104FZT	Ceramic	0.1 µF
C306	YF400220CHJT	Ceramic	22 pF
C307,308	YF400104FZT	Ceramic	0.1 µF
C309	YF400220CHJT	Ceramic	22 pF
C310	ECST1AC106ZR	Tantalum	10 µF 10V
C311	YF400101CHDT	Ceramic	100 pF
C312	ECEA0GKK220	Electrolytic	22 µF 4V
C313,314	ECSF1AE686	Tantalum	68 µF 16V
C315	ECSF1CE476	Tantalum	47 µF 16V
C316	YF400220CHJT	Ceramic	22 pF
C317	ECST1ED106ZR	Tantalum	10 µF 10V
C320	YF400220CHJT	Ceramic	22 pF
C321	YF400390CHJT	Ceramic	39 pF
C323	YF400101CHJT	Ceramic	100 pF
C325	YF400680CHJT	Ceramic	68 pF
C326	ECSF1AE106	Tantalum	10 µF 10V
C327	YF400680CHJT	Ceramic	68 pF
C328	ECSF1AE106	Tantalum	10 µF 10V
C330	YF400680CHJT	Ceramic	68 pF
C331	ECSF1AE106	Tantalum	10 µF 10V
C332,333	ECEA0JKS101	Electrolytic	100 µF 6.3V
C334-336	ECEA0JSN470	Electrolytic	47 µF 6.3V
C337	YWU21UJ100J	Ceramic	10 pF
C338	YWU21UJ390J	Ceramic	39 pF
C339	YWU21UJ330J	Ceramic	33 pF
C355	YF400103XKT	Ceramic	0.01 µF
C356	ECSF1CE226	Tantalum	22 µF 16V
L105,106	YFF3216E8R2K	Coil	8.2 µH
L108,109	YFF3216E8R2K	Coil	8.2 µH
L110	EL05SI470K	Coil	47 µH
L111,112	YFF3216E8R2K	Coil	8.2 µH
L113	YFF051070	Coil	
L115	YFF3216A2R2K	Coil	2.2 µH
L304	YWF3216A4R7K	Coil	4.7 µH
L305-307	YWNL32100K	Coil	10 µH
CF1-7	YW2743019446	Filter	
CF10,21	YW2743019446	Filter	
CF301	YWEIR5QA004Q	Filter	
CF401	YWEIR5QA005Q	Filter	
J41	YF21160R00T	Jumper Resistor	
J101-104	ERJ8GCS0R00	Jumper Resistor	
J107	ERJ8GCS0R00	Jumper Resistor	
J108	YF21160R00T	Jumper Resistor	
J114,	YF21160R00T	Jumper Resistor	
J120	YF21160R00T	Jumper Resistor	
J125,130	YF21160R00T	Jumper Resistor	
J150,160	YF21160R00T	Jumper Resistor	
J164,189	YF21160R00T	Jumper Resistor	
J198,205	YF21160R00T	Jumper Resistor	

REF.NO.	PART NO.	DESCRIPTION
J235-241	YF21160R00T	Jumper Resistor
J301	ERJ8GCS0R00	Jumper Resistor
	YF21160R00T	Jumper Resistor
J302,303	ERJ8GCS0R00	Jumper Resistor
J308,315	YF21160R00T	Jumper Resistor
J377-379	YF21160R00T	Jumper Resistor
CN1	FCN215Q050G0	50-pin Connector
CN2,4	YW520301010	10-pin Connector
CN3,5	EMCS0650Z	6-pin Connector
CN6,7	EMCS0250Z	2-pin Connector
TP1	YW32BM5A	Test-pin
TP101-106	YW32BM5A	Test-pin
M121	YWV2HA0705A3	Shield Cover A for Drive
M122	YWV2HA0706A3	Shield Case A for Drive
M123	YWV2HA0707A3	Shield Cover B for Priamp
M124	YWV2HA0708A3	Shield Case B for Priamp
M125	YWV2HA0709A3	Shield Cover C for Process
M126	YWV2HA0710A3	Shield Case C for Process

PROCESS/DETAIL BOARD

PCB5 (NLA)	YWVKCF70HE2A	Printed Circuit Board Assy
IC1-3	YWHB70A	IC
IC4	YWNJU4093BM	IC
IC5	MN4049BS	IC
IC6	NJM2904M	IC
IC7	YWUPC2372AG	IC
IC8	NJM2902M	IC
IC9	AN90B01S	IC
IC10,11	MN3802A	IC
IC12	AN90B01S	IC
IC13	NJU4053BM	IC
IC14	NJM2904M	IC
IC15	NJM592M8	IC
Q1	2SD973-QRS	Transistor
Q2-4	2SB1218-QRS	Transistor
Q5	2SD1819-QRS	Transistor
Q6	2SC3931-CD	Transistor
Q7	2SD1819-QRS	Transistor
Q8	2SB1218-QRS	Transistor
Q9	2SD1819-QRS	Transistor
Q10	2SC3931-CD	Transistor
Q11	2SD1819-QRS	Transistor
Q12	2SB1218-QRS	Transistor
Q13	2SD1819-QRS	Transistor
Q14	2SC3931-CD	Transistor
Q15,17	2SD1819-QRS	Transistor
Q18-22	2SD1819-QRS	Transistor
Q23	2SC3931-CD	Transistor
Q24	2SA1531-ST	Transistor
Q25,26	2SD1819-QRS	Transistor
Q27	2SB1218-QRS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q28	2SD1819-QRS	Transistor	
Q29	2SC3931-CD	Transistor	
Q30	XN4601	Transistor	
Q33	2SC3931-CD	Transistor	
Q34	2SC3929-RS	Transistor	
Q35	2SB1218-QRS	Transistor	
Q38	2SD1819-QRS	Transistor	
Q39,40	2SC3931-CD	Transistor	
Q41	2SD1819-QRS	Transistor	
Q44	2SB1218-QRS	Transistor	
Q45	2SC3929-RS	Transistor	
Q46	2SC3931-CD	Transistor	
Q49	XN4601	Transistor	
Q50	2SC3931-CD	Transistor	
Q51,52	2SD1819-QRS	Transistor	
Q53	2SC3931-CD	Transistor	
Q54	2SA1531-ST	Transistor	
Q55	2SD1819-QRS	Transistor	
Q56	2SC3931-CD	Transistor	
Q57	2SA1531-ST	Transistor	
Q58,62	2SD1819-QRS	Transistor	
Q63	2SC3931-CD	Transistor	
Q64,65	2SD1819-QRS	Transistor	
Q66	2SA1531-ST	Transistor	
Q67,68	2SC3931-CD	Transistor	
Q69	2SD1819-QRS	Transistor	
Q72-75	2SB1218-QRS	Transistor	
Q76	2SK662-PQR	FET	
Q77	2SD1819-QRS	Transistor	
Q78,79	2SK662-PQR	FET	
Q80,81	2SD1819-QRS	Transistor	
Q82-84	2SB1218-QRS	Transistor	
D2	MA141WK	Diode	
D3-5	MA141K	Diode	
D6	MA141WA	Diode	
D7-12	MA141K	Diode	
D13,14	1SS97-2	Diode	
D15	MA141K	Diode	
R1-3	ERJ3GEYJ221	Metal	220 ohms 1/16W
R4	ERJ3GEYJ334	Metal	330K 1/16W
R5	ERJ3GEYJ224	Metal	220K ohms 1/16W
R6	ERJ3GEYJ512	Metal	5.1K ohms 1/16W
R7	ERJ3GEYJ334	Metal	330K 1/16W
R8	ERJ3GEYJ224	Metal	220K ohms 1/16W
R9,10	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R11,12	ERJ3GEYJ103	Metal	10K ohms 1/16W
R13,14	ERJ3GEYJ102	Metal	1K ohms 1/16W
R15	ERJ3GEYJ223	Metal	22K ohms 1/16W
R16	ERJ3GEYJ104	Metal	100K ohms 1/16W
R17	ERJ3GEYJ223	Metal	22K ohms 1/16W
R18	ERJ3GEYJ104	Metal	100K ohms 1/16W
R19	ERJ3GEYJ223	Metal	22K ohms 1/16W
R20	ERJ3GEYJ104	Metal	100K ohms 1/16W
R21	YWR1220P622D	Metal	6.2K ohms 1/16W
R22	YWR1220P242D	Metal	2.4K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R23	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R24-30	ERJ3GEYJ103	Metal	10K ohms 1/16W
R31-33	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R34	YWR1220P362D	Metal	3.6K ohms
R35	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R36	ERJ3GEYJ223	Metal	22K ohms 1/16W
R37,38	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R39	YWR1220P362D	Metal	3.6K ohms
R40	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R41	ERJ3GEYJ223	Metal	22K ohms 1/16W
R42,43	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R44	YWR1220P362D	Metal	3.6K ohms
R45	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R46	ERJ3GEYJ223	Metal	22K ohms 1/16W
R47	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R49	ERJ3GEYJ223	Metal	22K ohms 1/16W
R50	ERJ3GEYJ103	Metal	10K ohms 1/16W
R51-54	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R56	ERJ3GEYJ103	Metal	10K ohms 1/16W
R57	YWR1220P472D	Metal	4.7K ohms
R58	YWR1220P153D	Metal	15K ohms
R59	YWR1220P682D	Metal	6.8K ohms
R60	YWR1220P153D	Metal	15K ohms
R61	YFR1220P113D	Metal	11K ohms
R62	YWR1220P472D	Metal	4.7K ohms
R63	YWR1220P153D	Metal	15K ohms
R64	YWR1220P682D	Metal	6.8K ohms
R65,66	ERJ3GEYJ153	Metal	15K ohms 1/16W
R67	ERJ3GEYJ102	Metal	1K ohms 1/16W
R68	ERJ3GEYJ561	Metal	560 ohms 1/16W
R69	ERJ3GEYJ102	Metal	1K ohms 1/16W
R70	ERJ3GEYJ561	Metal	560 ohms 1/16W
R71,72	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R73	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R74	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R75	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R76	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R77,78	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R79,80	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R81,82	ERJ3GEYJ102	Metal	1K ohms 1/16W
R83	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R84	ERJ3GEYJ102	Metal	1K ohms 1/16W
R85	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R86	ERJ3GEYJ223	Metal	22K ohms 1/16W
R87	ERJ3GEYJ153	Metal	15K ohms 1/16W
R88	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R89	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R90	YFR1220P222D	Metal	2.2K ohms
R96	YWR1220P102D	Metal	1K ohms
R97	YWR1220P472D	Metal	4.7K ohms
R99	R1220P331D	Metal	330K ohms
R100	YWR1220P683D	Metal	68K ohms
R102	R1220P331D	Metal	330K ohms
R103	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R105	ERJ3GEYJ101	Carbon	100 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R106	ERJ3GEYJ223	Metal	22K ohms 1/16W
R107	ERJ3GEYJ103	Metal	10K ohms 1/16W
R108,109	ERJ3GEYJ562	Metal	5.6K ohms 1/16W
R110	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R111	ERJ3GEYJ221	Metal	220 ohms 1/16W
R113	YWR1220P152D	Metal	1.5K ohms
R114	YWR1220P332D	Metal	3.3K ohms
R115	ERJ3GEYJ151	Metal	150 ohms 1/16W
R116	ERJ3GEYJ103	Metal	10K ohms 1/16W
R117	ERJ3GEYJ561	Metal	560 ohms 1/16W
R118	ERJ3GEYJ301	Metal	300 ohms 1/16W
R119	ERSB15J102	Metal	1K ohms 1/4W
R120	ERJ3GEYJ561	Metal	560 ohms 1/16W
R121	ERJ3GEYJ151	Metal	150 ohms 1/16W
R122,123	ERJ3GEYJ102	Metal	1K ohms 1/16W
R124	ERSB15J102	Metal	1K ohms 1/4W
R125	ERJ3GEYJ151	Metal	150 ohms 1/16W
R126	ERJ3GEYJ102	Metal	1K ohms 1/16W
R127	ERJ3GEYJ301	Metal	300 ohms 1/16W
R128	ERJ3GEYJ102	Metal	1K ohms 1/16W
R129	ERJ3GEYJ103	Metal	10K ohms 1/16W
R130	ERJ3GEYJ151	Metal	150 ohms 1/16W
R132	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R133	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R134,135	ERJ3GEYJ562	Metal	5.6K ohms 1/16W
R136	ERJ3GEYJ103	Metal	10K ohms 1/16W
R137	ERJ3GEYJ223	Metal	22K ohms 1/16W
R138	YWR1220P391D	Metal	390 ohms
R139	YWR1220P682D	Metal	6.8K ohms
R140	R1220P621D	Metal	620 ohms
R144	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R145	YFR1220P222D	Metal	2.2K ohms
R146	YWR1220P182D	Metal	1.8K ohms
R147,148	YWR1220P122D	Metal	1.2K ohms
R150	YWR1220P182D	Metal	1.8K ohms
R151	R1220P363D	Metal	36K ohms
R153	YWR1220P153D	Metal	15K ohms
R159	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R160	ERJ3GEYJ153	Metal	15K ohms 1/16W
R161	ERJ3GEYJ223	Metal	22K ohms 1/16W
R162,163	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R164	ERJ3GEYJ223	Metal	22K ohms 1/16W
R165	ERJ3GEYJ153	Metal	15K ohms 1/16W
R166	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R167	ERJ3GEYJ223	Metal	22K ohms 1/16W
R168	ERJ3GEYJ153	Metal	15K ohms 1/16W
R169	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R172	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R173	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R174	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R175	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R176	ERJ3GEYJ122	Metal	1.2K ohms 1/16W
R177	ERJ3GEYJ331	Metal	330 ohms 1/16W
R178	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R179	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R180,181	ERJ3GEYJ102	Metal	1K ohms 1/16W
R182	ERJ3GEYJ222	Metal	2.2K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R183	ERJ3GEYJ153	Metal	15K ohms 1/16W
R184	ERJ3GEYJ104	Metal	100K ohms 1/16W
R185	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R186	ERJ3GEYJ223	Metal	22K ohms 1/16W
R187	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R188	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R189	YWR1220P682D	Metal	6.8K ohms
R190	YWR1220P182D	Metal	1.8K ohms
R193	ERJ3GEYJ102	Metal	1K ohms 1/16W
R194	ERJ3GEYJ331	Metal	330 ohms 1/16W
R196	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R197	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R205	ERJ3GEYJ223	Metal	22K ohms 1/16W
R206	ERJ3GEYJ333	Metal	33K ohms 1/16W
R207	ERJ3GEYJ223	Metal	22K ohms 1/16W
R208	ERJ3GEYJ333	Metal	33K ohms 1/16W
R209	ERJ3GEYJ153	Metal	15K ohms 1/16W
R210	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R211	ERJ3GEYJ102	Metal	1K ohms 1/16W
R212	ERJ3GEYJ154	Metal	150K ohms 1/16W
R213	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R214,215	ERJ3GEYJ331	Metal	330 ohms 1/16W
R216	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R217,218	ERJ3GEYJ102	Metal	1K ohms 1/16W
R219	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R220	ERJ3GEYJ562	Metal	5.6K ohms 1/16W
R221	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R222	ERJ3GEYJ562	Metal	5.6K ohms 1/16W
R223	ERJ3GEYJ681	Metal	680 ohms 1/16W
R224	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R225	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R226	ERJ3GEYJ103	Metal	10K ohms 1/16W
R227,228	ERJ3GEYJ331	Metal	330 ohms 1/16W
R229	ERJ3GEYJ103	Metal	10K ohms 1/16W
R230	ERJ3GEYJ224	Metal	220K ohms 1/16W
R231	ERJ3GEYJ103	Metal	10K ohms 1/16W
R232	ERJ3GEYJ224	Metal	220K ohms 1/16W
R233	ERJ3GEYJ103	Metal	10K ohms 1/16W
R234,235	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R236,237	ERJ3GEYJ102	Metal	1K ohms 1/16W
R238	ERJ3GEYJ182	Metal	1.8K ohms 1/16W
R239	ERJ3GEYJ104	Metal	100K ohms 1/16W
R240-242	YWR1220P152D	Metal	1.5K ohms
R246	YWR1220P102D	Metal	1K ohms
R247	ERJ3GEYJ103	Metal	10K ohms 1/16W
R248	ERJ3GEYJ104	Metal	100K ohms 1/16W
R249	ERJ3GEYJ223	Metal	22K ohms 1/16W
R250	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R251	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R252,253	ERJ3GEYJ202	Metal	2K ohms 1/16W
R254	ERJ3GEYJ102	Metal	1K ohms 1/16W
R255	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R256,257	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R258	ERJ3GEYJ102	Metal	1K ohms 1/16W
R259	ERJ3GEYJ103	Metal	10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R260	ERJ3GEYJ164	Metal	160K ohms 1/16W
R261	ERJ3GEYJ103	Metal	10K ohms 1/16W
R262	ERJ3GEYJ164	Metal	160K ohms 1/16W
R263	ERJ3GEYJ103	Metal	10K ohms 1/16W
R264	ERJ3GEYJ164	Metal	160K ohms 1/16W
R265	ERJ3GEYJ331	Metal	330 ohms 1/16W
R270	ERJ3GEYJ473	Metal	47K ohms 1/16W
VR1	EVML1GA00B15	Variable Resistor	100K ohms
VR2	EVML1GA00B23	Variable Resistor	2K ohms
VR3	EVML1GA00B15	Variable Resistor	100K ohms
VR4	EVML1GA00B23	Variable Resistor	2K ohms
VR5	EVML1GA00B15	Variable Resistor	100K ohms
VR6	EVML1GA00B13	Variable Resistor	1K ohms
VR7-11	EVML1GA00B24	Variable Resistor	20K ohms
VR15-17	EVML1GA00B24	Variable Resistor	20K ohms
VR18	EVML1GA00B14	Variable Resistor	10K ohms
VR19	EVML3GA00B23	Variable Resistor	2K ohms
VR20	EVML3GA00B52	Variable Resistor	500 ohms
VR21,22	EVML3GA00B23	Variable Resistor	2K ohms
VR23	EVML3GA00B52	Variable Resistor	500 ohms
VR24	EVML3GA00B13	Variable Resistor	1K ohms
VR25	EVML1GA00B53	Variable Resistor	5K ohms
VR26	EVML3GA00B15	Variable Resistor	100K ohms
VR27,28	EVML3GA00B53	Variable Resistor	5K ohms
VR29	EVML1GA00B23	Variable Resistor	2K ohms
VR30	EVML1GA00B13	Variable Resistor	1K ohms
VR31	EVML3GA00B23	Variable Resistor	2K ohms
VR32	EVML3GA00B53	Variable Resistor	5K ohms
C1	ECEA1ASN100	Electrolytic	10 μF 10V
C2	ECEA1CKS470	Electrolytic	47 μF 16V
C3	ECEA0JKA470	Electrolytic	47 μF 6.3V (KA)
C4	ECEA1ASN100	Electrolytic	10 μF 10V
C5	ECEA1CKS470	Electrolytic	47 μF 16V
C6	ECEA0JKA470	Electrolytic	47 μF 6.3V (KA)
C7	ECEA1ASN100	Electrolytic	10 μF 10V
C8	ECEA1CKS470	Electrolytic	47 μF 16V
C9	ECEA0JKA470	Electrolytic	47 μF 6.3V (KA)
C10	YW5F104Z2VB	Ceramic	0.1 μF
C11	YW5CH680J5VB	Ceramic	68 pF
C12,13	YW5F104Z2VB	Ceramic	0.1 μF
C14	ECEA1HKK010	Electrolytic	1 μF 50V
C15,16	ECEA0JKA470	Electrolytic	47 μF 6.3V (KA)
C17	YW5F104Z2VB	Ceramic	0.1 μF
C18	ECEA1AKK100	Electrolytic	10 μF 10V
C19	ECEA0GKS221	Electrolytic	220 μF 4V
C20	ECEA1AKS470	Electrolytic	47 μF 10V
C21	ECEA1HKKR47	Electrolytic	0.47μF 50V
C22-24	ECEA1HKK010	Electrolytic	1 μF 50V
C25	ECEA1HKKR47	Electrolytic	0.47 μF 50V
C26-28	ECEA1HKK010	Electrolytic	1 μF 50V
C29	ECEA1HKKR47	Electrolytic	0.47 μF 50V
C30-32	ECEA1HKK010	Electrolytic	1 μF 50V

REF.NO.	PART NO.	DESCRIPTION	
C33-35	YF426104XKS	Ceramic	0.1 µF
C36	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C37	ECEA1CKK100	Electrolytic	10 µF 16V
C38	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C39	YF426104XKS	Ceramic	0.1 µF
C40	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C41	ECEA1AKK100	Electrolytic	10 µF 10V
C42	ECEA1CKS470	Electrolytic	47 µF 16V
C43	YF426104XKS	Ceramic	0.1 µF
C44	ECEA1AKS470	Electrolytic	47 µF 10V
C45	YW5CH060D5VB	Ceramic	6 pF
C47	YF426104XKS	Ceramic	0.1 µF
C48	ECEA1CKS470	Electrolytic	47 µF 16V
C52	ECSF1AE476	Tantalum	47 µF 10V
C53,54	YW5F104Z2VB	Ceramic	0.1 µF
C55	ECSF1EE225	Electrolytic	2.2 µF 25V
C56	YW5X103K2VB	Ceramic	0.01 µF
C57	YW5X102K5VB	Ceramic	1000 pF
C58	YW5X103K2VB	Ceramic	0.01 µF
C59	ECSF1EE225	Tantalum	2.2 µF 25V
C60-62	YW5X103K2VB	Ceramic	0.01 µF
C63	YW5F104Z2VB	Ceramic	0.1 µF
C64	ECEA1AKS470	Electrolytic	47 µF 10V
C66	ECEA1CKS470	Electrolytic	47 µF 16V
C67	ECEA1AKS470	Electrolytic	47 µF 10V
C68	YW5X102K5VB	Ceramic	1000 pF
C69	ECSF1EE225	Tantalum	2.2 µF 25V
C70	YW5X103K2VB	Ceramic	0.01 µF
C71	ECSF1AE476	Tantalum	47 µF 10V
C72,73	YW5F104Z2VB	Ceramic	0.1 µF
C74-76	YW5X103K2VB	Ceramic	0.01 µF
C77	ECSF1EE225	Tantalum	2.2 µF 25V
C80	ECEA1AKS470	Electrolytic	47 µF 10V
C82	ECEA1CKS470	Electrolytic	47 µF 16V
C83	YF426104XKS	Ceramic	0.1 µF
C84,85	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C88	YW5CH050D5VB	Ceramic	5 pF
C89	ECEA1AKS470	Electrolytic	47 µF 10V
C90	ECEA1AKK100	Electrolytic	10 µF 10V
C91	ECEA1AKS470	Electrolytic	47 µF 10V
C92	ECEA1CKS470	Electrolytic	47 µF 16V
C93	ECEA1ASN100	Electrolytic	10 µF 10V
C94	YF426104XKS	Ceramic	0.1 µF
C96	YW5F104Z2VB	Ceramic	0.1 µF
C98	ECEA1ASN100	Electrolytic	10 µF 10V
C99	ECEA1AKS470	Electrolytic	47 µF 10V
C100,101	YW5F104Z2VB	Ceramic	0.1 µF
C102	ECEA1AKS470	Electrolytic	47 µF 10V
C103	ECEA1CKS470	Electrolytic	47 µF 16V
C105	YW5F104Z2VB	Ceramic	0.1 µF
C109	ECEA1CSN100	Electrolytic	10 µF 16V
C111	YW5CH560J5VB	Ceramic	56 pF
C112	ECEA1AKN470	Electrolytic	47 µF 10V
C113	YW5CH050D5VB	Ceramic	5 pF
C114	ECEA1AKN470	Electrolytic	47 µF 10V

REF.NO.	PART NO.	DESCRIPTION	
C115	ECEA1CKS470	Electrolytic	47 µF 16V
C116	ECEA1CKA101	Electrolytic	100 µF 16V
C117	ECEA1CKS470	Electrolytic	47 µF 16V
C118	ECEA1CKA101	Electrolytic	100 µF 16V
C119	ECSF1CE476	Electrolytic	47 µF 16V
C121,122	YW5CH100J5VB	Ceramic	10 pF
C123	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C124,125	YW5CH100J5VB	Ceramic	10 pF
C127	YW5CH101J5VB	Ceramic	100 pF
C128,129	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
L1	EL05SI220K	Coil	22 µH
L2,3	YFEL05SI2R2K	Coil	2.2 µH
L5	YWF3216C330K	Coil	33 µH
SW1	YWSSS21200	Slide Switch	
CF1	ELB4M069	Filter	
CF2	ELB4N042	Filter	
CF3	YWELB4L074	Filter	
CF4	ELB4L118	Filter	
CF5	ELB4K054	Delay Line	
CF6	ELB4M077	Filter	
CF7	YWZLB5L4937	Filter	
CN1	FCN215Q050G0	50-pin Connector	
J95	ERJ3GEY0R00	Jumper Resistor	
J98,101	YF21160R00T	Jumper Resistor	
J141,149	YF21160R00T	Jumper Resistor	
J152,154	YF21160R00T	Jumper Resistor	
J243-245	ERJ3GEY0R00	Jumper Resistor	
J268-269		Jumper Resistor	
TP1-20	YW32BM5A	Test-pin	

SYNC/ENCODER BOARD

PCB6 (NLA)	YWVKBF70HE3A	Printed Circuit Board Assy	
IC1	HD14572UBFP	IC	
IC2	MN4516BS	IC	
IC3	MN74HC4049S	IC	
IC4	YWMB87075A	IC	
IC5	MN4073BS	IC	
IC6,7	NJU4053BM	IC	
IC8	YWM51272FP	IC	
IC9	YWNJM2207D	IC	
IC10	YWCX20095A	IC	
IC11	MN4049BS	IC	
IC12	YWTC7S00FR	IC	
IC13	YWTC4S81FR	IC	
IC15	NJM2904M	IC	
IC16	YWUPC4062G2	IC	
IC17	YWTC7S02FR	IC	
IC18	YWTC4S66FR	IC	
IC19	MN4001BS	IC	
IC20	YWTC4S69F	IC	
IC21	MN74HC74S	IC	

REF.NO.	PART NO.	DESCRIPTION	
Q1-3	2SD601-RS	Transistor	
Q4	2SB709-RS	Transistor	
Q5-7	2SD601-RS	Transistor	
Q8	2SC2404-CD	Transistor	
Q9	2SB709-RS	Transistor	
Q10	2SC2404-CD	Transistor	
Q11,12	2SB709-RS	Transistor	
Q13	2SC2404-CD	Transistor	
Q14,17	2SD601-RS	Transistor	
Q18,19	2SD601-RS	Transistor	
Q20	2SC2404-CD	Transistor	
Q21-26	2SD601-RS	Transistor	
Q28-31	2SD601-RS	Transistor	
Q33	2SB709-RS	Transistor	
Q34-36	2SC2404-CD	Transistor	
Q37	2SB709-RS	Transistor	
Q40	2SC2405ST	Transistor	
Q41	2SC2404-CD	Transistor	
Q42	2SA1034-ST	Transistor	
Q43-47	2SD601-RS	Transistor	
Q48	2SB709-RS	Transistor	
Q53	2SD601-RS	Transistor	
Q54	2SC2404-CD	Transistor	
Q55,57	2SD601-RS	Transistor	
Q58	2SD601-RS	Transistor	
D1,2	YWFC54M	Diode	
D3,4	YWHZ4B2	Diode	
D6	MA151K	Diode	
D8	YWFC54M	Diode	
D9,10	MA151K	Diode	
TH180	PTR4C41332J	Tharmistor	
R1	YF2116223JT	Carbon	22K ohms 1/16W
R2	YF2116101JT	Carbon	100 ohms 1/16W
R3,4	YF2116103JT	Carbon	10K ohms 1/16W
R5	YF2116332JT	Carbon	3.3K ohms 1/16W
R6	YF2116102GT	Carbon	1K ohms 1/16W
R7	YF2116152JT	Carbon	1.5K ohms 1/16W
R8	YF2116332JT	Carbon	3.3K ohms 1/16W
R9	YF2116101JT	Carbon	100 ohms 1/16W
R10	YF2116102GT	Carbon	1K ohms 1/16W
R11	YF2116224JT	Carbon	220K ohms 1/16W
R12	YF2116472GT	Carbon	4.7K ohms 1/16W
R13	YF2116103JT	Carbon	10K ohms 1/16W
R14	YF2116472GT	Carbon	4.7K ohms 1/16W
R15	YF2116103JT	Carbon	10K ohms 1/16W
R16,17	YF2116472GT	Carbon	4.7K ohms 1/16W
R18	YF2116103JT	Carbon	10K ohms 1/16W
R19	YF2116222GT	Carbon	2.2K ohms 1/16W
R20	YF2116152JT	Carbon	1.5K ohms 1/16W
R21,22	YF2116223JT	Carbon	22K ohms 1/16W
R23,24	YF2116102GT	Carbon	1K ohms 1/16W
R25	YF2116272JT	Carbon	2.7K ohms 1/16W
R26	YF2116121JT	Carbon	120 ohms 1/16W
R27	YF2116562JT	Carbon	5.6K ohms 1/16W
R28	YF2116183GT	Carbon	18K ohms 1/16W
R29	YF2116123JT	Carbon	12K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R30	YF2116103JT	Carbon	10K ohms 1/16W
R31	YF2116332JT	Carbon	3.3K ohms 1/16W
R32	YF2116152JT	Carbon	1.5K ohms 1/16W
R33	YF2116102GT	Carbon	1K ohms 1/16W
R34	YF2116561JT	Carbon	560 ohms 1/16W
R35	YF2116152JT	Carbon	1.5K ohms 1/16W
R36	YF2116223JT	Carbon	22K ohms 1/16W
R37	YF2116102GT	Carbon	1K ohms 1/16W
R38	YF2116221JT	Carbon	220 ohms 1/16W
R39	YF2116333GT	Carbon	33K ohms 1/16W
R40	YF2116104JT	Carbon	100K ohms 1/16W
R41	YF2116564JT	Carbon	560K ohms 1/16W
R42,43	YF2116101JT	Carbon	100 ohms 1/16W
R45	YF2116331JT	Carbon	330 ohms 1/16W
R46	YF2116472GT	Carbon	4.7K ohms 1/16W
R47	YF2116101JT	Carbon	100 ohms 1/16W
R48	YF2116682JT	Carbon	6.8K ohms 1/16W
R49	YF2116104JT	Carbon	100K ohms 1/16W
R50	YF2116564JT	Carbon	560K ohms 1/16W
R51	YF2116331JT	Carbon	330 ohms 1/16W
R52,53	YF2116103JT	Carbon	10K ohms 1/16W
R54	YF2116331JT	Carbon	330 ohms 1/16W
R55	YF2116564JT	Carbon	560K ohms 1/16W
R56	YF2116471JT	Carbon	470 ohms 1/16W
R58	YF2116331JT	Carbon	330 ohms 1/16W
R59	YF2116104JT	Carbon	100K ohms 1/16W
R61	YF2116683GT	Carbon	68K ohms 1/16W
R62	YF2116331JT	Carbon	330 ohms 1/16W
R63	YF2116564JT	Carbon	560K ohms 1/16W
R64	YWR1220P471D	Metal	470 ohms
R65	YF2116334JT	Carbon	330K 1/16W
R66	YF2116224JT	Carbon	220K ohms 1/16W
R67	YWR1220P102D	Metal	1K ohms
R69	YWR1220P272D	Metal	2.7K ohms
R70	YWR1220P101D	Metal	100 ohms
R71	YWR1220P102D	Metal	1K ohms
R72,73	YF2116101JT	Carbon	100 ohms 1/16W
R74	YF2116102GT	Carbon	1K ohms 1/16W
R76,77	YF2116101JT	Carbon	100 ohms 1/16W
R78	YF2116102GT	Carbon	1K ohms 1/16W
R79,80	YF2116221JT	Carbon	220 ohms 1/16W
R82	YWR1220P223D	Metal	22K ohms
R83	YF2116562JT	Carbon	5.6K ohms 1/16W
R84-87	YF2116101JT	Carbon	100 ohms 1/16W
R88	YF2116823JT	Carbon	82K ohms 1/16W
R90	YF2116683GT	Carbon	68K ohms 1/16W
R91	YWR1220P103D	Metal	10K ohms
R92	YWR1220P153D	Metal	15K ohms
R93	YWR1220P562D	Metal	5.6K ohms
R94	R1220P822D	Metal	8.2K ohms
R95	YWR1220P562D	Metal	5.6K ohms
R96	R1220P822D	Metal	8.2K ohms
R97	YWR1220P562D	Metal	5.6K ohms
R98	R1220P822D	Metal	8.2K ohms

REF.NO.	PART NO.	DESCRIPTION	
R99	YF2116272JT	Carbon	2.7K ohms 1/16W
R100-102	YWR1220P152D	Metal	1.5K ohms
R103	YF2116222GT	Carbon	2.2K ohms 1/16W
R104-106	YF2116102GT	Carbon	1K ohms 1/16W
R107	YWR1220P303D	Metal	30K ohms
R108	YWR1220P182D	Metal	1.8K ohms
R109	YWR1220P332D	Metal	3.3K ohms
R110	YWR1220P241D	Metal	240 ohms
R111	YWR1220P912D	Metal	9.2K ohms
R112	YWR1220P561D	Metal	560 ohms
R113	YF2116122JT	Carbon	1.2K ohms 1/16W
R114	YWR1220P182D	Metal	1.8K ohms
R115	YF2116101JT	Carbon	100 ohms 1/16W
R116	YF2116472GT	Carbon	4.7K ohms 1/16W
R117,118	YF2116471JT	Carbon	470 ohms 1/16W
R119	YF2116102GT	Carbon	1K ohms 1/16W
R120	YF2116222GT	Carbon	2.2K ohms 1/16W
R121	YF2116103JT	Carbon	10K ohms 1/16W
R122	YF2116472GT	Carbon	4.7K ohms 1/16W
R123,124	YFR1220P222D	Metal	2.2K ohms
R125	YWR1220P391D	Metal	390 ohms
R126	YFR1220P222D	Metal	2.2K ohms
R127	YWR1220P332D	Metal	3.3K ohms
R128	YWR1220P471D	Metal	470 ohms
R129	YF2116103JT	Carbon	10K ohms 1/16W
R131	YF2116102GT	Carbon	1K ohms 1/16W
R132	YF2116222GT	Carbon	2.2K ohms 1/16W
R133	YF2116103JT	Carbon	10K ohms 1/16W
R134	YF2116472GT	Carbon	4.7K ohms 1/16W
R135	YWR1220P332D	Metal	3.3K ohms
R136	YWR1220P202D	Metal	2K ohms
R137	YWR1220P221D	Metal	220 ohms
R138	R1220P123D	Metal	12K ohms
R139	YWR1220P561D	Metal	560 ohms
R140	YFR1220P222D	Metal	2.2K OHMS
R141	YF2116331JT	Carbon	330 ohms 1/16W
R142	YF2116103JT	Carbon	10K ohms 1/16W
R144	YF2116121JT	Carbon	120 ohms 1/16W
R145	YF2116152JT	Carbon	1.5K ohms 1/16W
R146	YWR1220P683D	Metal	68K ohms
R147	YWR1220P393D	Metal	39K ohms
R148	YW2116182JT	Carbon	1.8K ohms 1/16W
R149	YF2116272JT	Carbon	2.7K ohms 1/16W
R150	YF2116332JT	Carbon	3.3K ohms 1/16W
R151	YF2116103JT	Carbon	10K ohms 1/16W
R152	YF2116223JT	Carbon	22K ohms 1/16W
R153	YF2116562JT	Carbon	5.6K ohms 1/16W
R156	YF2116221JT	Carbon	220 ohms 1/16W
R158	YF2116123JT	Carbon	12K ohms 1/16W
R159	YF2116472GT	Carbon	4.7K ohms 1/16W
R160,161	YF2116102GT	Carbon	1K ohms 1/16W
R162	YF2116103JT	Carbon	10K ohms 1/16W
R163	YF2116152JT	Carbon	1.5K ohms 1/16W
R164	YF2116103JT	Carbon	10K ohms 1/16W
R165	YF2116332JT	Carbon	3.3K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R166	YW2116182JT	Carbon	1.8K ohms 1/16W
R167,168	YF2116332JT	Carbon	3.3K ohms 1/16W
R169	YF2116103JT	Carbon	10K ohms 1/16W
R170,171	YF2116561JT	Carbon	560 ohms 1/16W
R172	YF2116102GT	Carbon	1K ohms 1/16W
R173	YF2116103JT	Carbon	10K ohms 1/16W
R174	YF2116152JT	Carbon	1.5K ohms 1/16W
R175	YF2116104JT	Carbon	100K ohms 1/16W
R176	YF2116101JT	Carbon	100 ohms 1/16W
R177	YF2116473GT	Carbon	47K ohms 1/16W
R178	YF2116332JT	Carbon	3.3K ohms 1/16W
R179	YF2116103JT	Carbon	10K ohms 1/16W
R181	YF2116332JT	Carbon	3.3K ohms 1/16W
R182	YF2116822JT	Carbon	8.2K ohms 1/16W
R183	YF2116113JT	Carbon	11K ohms 1/16W
R184	YF2116622JT	Carbon	6.2K ohms 1/16W
R185	YF2116202JT	Carbon	2K ohms 1/16W
R186	YF2116332JT	Carbon	3.3K ohms 1/16W
R187	YF2116123JT	Carbon	12K ohms 1/16W
R188	YF2116822JT	Carbon	8.2K ohms 1/16W
R189	YF2116334JT	Carbon	330K 1/16W
R190,191	YF2116471JT	Carbon	470 ohms 1/16W
R192	YF2116181JT	Carbon	180 ohms 1/16W
R193,194	YF2116102GT	Carbon	1K ohms 1/16W
R195	YF2116332JT	Carbon	3.3K ohms 1/16W
R196,197	YF2116103JT	Carbon	10K ohms 1/16W
R198	YF2116472GT	Carbon	4.7K ohms 1/16W
R199	YF2116102GT	Carbon	1K ohms 1/16W
R200	YF2116332JT	Carbon	3.3K ohms 1/16W
R219,220	YF2116103JT	Carbon	10K ohms 1/16W
R222	YF2116332JT	Carbon	3.3K ohms 1/16W
R223,224	YF2116222GT	Carbon	2.2K ohms 1/16W
R225,226	YF2116332JT	Carbon	3.3K ohms 1/16W
R227	YF2116103JT	Carbon	10K ohms 1/16W
R228	YF2116222GT	Carbon	2.2K ohms 1/16W
R229	YF2116750JT	Carbon	75 ohms 1/16W
R230	YF2116152JT	Carbon	1.5K ohms 1/16W
R231	YF2116332JT	Carbon	3.3K ohms 1/16W
R232	YF2116104JT	Carbon	100K ohms 1/16W
R233	YF2116221JT	Carbon	220 ohms 1/16W
R234	YWR1220P101D	Metal	100 ohms
R238	YF2116103JT	Carbon	10K ohms 1/16W
R242	YF2116103JT	Carbon	10K ohms 1/16W
R244	YF2116753JT	Carbon	75K ohms 1/16W
R246	YF2116101JT	Carbon	100 ohms 1/16W
R247,248	YF2116333GT	Carbon	33K ohms 1/16W
R251	YF2116561JT	Carbon	560 ohms 1/16W
R252	YF2116471JT	Carbon	470 ohms 1/16W
R253	YF2116563JT	Carbon	56K ohms 1/16W
R255	YF2116333GT	Carbon	33K ohms 1/16W
R256	YF2116224JT	Carbon	220K ohms 1/16W
R257	YWR1220P223D	Metal	22K ohms
R259	YF2116683GT	Carbon	68K ohms 1/16W
R260,261	YF2116103JT	Carbon	10K ohms 1/16W
R262	YF2116101JT	Carbon	100 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R263	YF2116223JT	Carbon	22K ohms 1/16W
R266,270	YWR1220P103D	Metal	10K ohms
R300	YF2116563JT	Carbon	56K ohms 1/16W
R301,302	YF2116103JT	Carbon	10K ohms 1/16W
R311	YF2116221JT	Carbon	220 ohms 1/16W
VR1,5	EVML3GA00B53	Variable Resistor	5KB ohms
VR7	EVML3GA00B14	Variable Resistor	10KB ohms
VR8	EVML1GA00B13	Variable Resistor	1KB ohms
VR9	EVML1GA00B53	Variable Resistor	5KB ohms
VR10	EVML1GA00B23	Variable Resistor	2KB ohms
VR11	EVML1GA00B53	Variable Resistor	5KB ohms
VR12	EVML1GA00B23	Variable Resistor	2KB ohms
VR13-15	EVML1GA00B13	Variable Resistor	1KB ohms
VR16	EVML1GA00B53	Variable Resistor	5KB ohms
VR17	EVML1GA00B24	Variable Resistor	20KB ohms
VR18	EVML1GA00B53	Variable Resistor	5KB ohms
VR19	EVML3GA00B14	Variable Resistor	10KB ohms
VR22	EVML1GA00B23	Variable Resistor	2KB ohms
VR23	EVML3GA00B54	Variable Resistor	50KB ohms
C1	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C2	ECEA1EKA4R7	Electrolytic	4.7 µF 25V
C3	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C5	YF400181CHJT	Ceramic	180 pF
C6	ECQP1101JZ	Plastic	100 pF 100V
C7	ECEA1AKS470	Electrolytic	47 µF 10V
C9	YF400104FZT	Ceramic	0.1 µF
C10	ECSF1AE106	Tantalum	10 µF 10V
C11,12	YF426103XMS	Ceramic	0.01 µF
C13	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C14	YF400104FZT	Ceramic	0.1 µF
C15,16	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C17	YW400102CHJT	Ceramic	1000 pF
C18	YF400221CHJT	Ceramic	220 pF
C19,20	YF400100CHJT	Ceramic	10 pF
C21	ECSF1CE225	Tantalum	2.2 µF 16V
C22	YW400102CHJT	Ceramic	1000 pF
C23	YF400221CHJT	Ceramic	220 pF
C24,25	YF400100CHJT	Ceramic	10 pF
C26	YW400102CHJT	Ceramic	1000 pF
C27-29	ECSF1AE475	Tantalum	4.7 µF 10V
C30	YF400104FZT	Ceramic	0.1 µF
C31	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C32,33	ECEA1AKS470	Electrolytic	47 µF 10V
C34,35	ECSF1AE476	Tantalum	47 µF 10V
C36,37	YF400100CHJT	Ceramic	10 pF
C38	YF400221CHJT	Ceramic	220 pF
C39	YW400102CHJT	Ceramic	1000 pF
C40	YF400101CHJT	Ceramic	100 pF
C41	ECEA1HKAR47	Electrolytic	0.47 µF 50V
C42,43	YWU21UJ100J	Ceramic	10 pF
C44,45	ECSF1AE475	Tantalum	4.7 µF 10V
C47	YF400220CHJT	Ceramic	22 pF
C48	ECSF1AE475	Tantalum	4.7 µF 10V
C49	YF400104FZT	Ceramic	0.1 µF
C50-52	YF400100CHJT	Ceramic	10 pF

REF.NO.	PART NO.	DESCRIPTION	
C54-56	ECSF1AE475	Electrolytic	4.7 µF 10V
C57,58	YF426102CHJS	Ceramic	1000 pF 50V
C59,60	ECSF1AE475	Electrolytic	4.7 µF 10V
C61	YF400224FZT	Ceramic	0.22 µF
C62,63	ECSF1AE475	Electrolytic	4.7 µF 10V
C64	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C65	YF400271CHJT	Ceramic	270 pF
C66	ECEA0JKA331	Electrolytic	330 µF 6.3V
C67	ECSF1CE475	Electrolytic	4.7 µF 16V
C68	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C69	ECEA1AKS470	Electrolytic	47 µF 10V
C70	ECEA0JKS101	Electrolytic	100 µF 6.3V
C71	ECEA1AKS470	Electrolytic	47 µF 10V
C72,73	ECEA0JKS101	Electrolytic	100 µF 6.3V
C74	ECEA1AKA220	Electrolytic	22µF 10V
C75	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C76	ECEA1CKA100	Electrolytic	10µF 16V
C77,78	ECEA1ASN100	Electrolytic	10µF 10V
C79	ECEA1CKA100	Electrolytic	10µF 16V
C80,81	ECEA1HKA010	Electrolytic	1µF 50V
C82	YF400104FZT	Ceramic	0.1µ F
C83	YF400103XKT	Ceramic	0.01 µF
C84	YF400104FZT	Ceramic	0.1 µF
C85,86	YF400103XKT	Ceramic	0.01 µF
C87	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C88	YF400104FZT	Ceramic	0.1 µF
C89	ECEA0JKA470	Electrolytic	47µF 6.3V (KA)
C90	ECEA1ASN100	Electrolytic	10µF 10V
C91	ECEA1HKA010	Electrolytic	1 µF 50V
C92	YF400473FZT	Ceramic	0.047 µF
C93	YF400103XKT	Ceramic	0.01 µF
C95	YF400220CHJT	Ceramic	22 pF
C96,97	ECEA1AKS470	Electrolytic	47 µF 10V
C98	YF400104FZT	Ceramic	0.1 µF
C99	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C100	ECEA0JKA221	Electrolytic	220 µF 6.3V (KA)
C101	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C102	ECEA1HSN010	Electrolytic	1 µF 50V
C103	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C104-107	ECEA1CKA100	Electrolytic	10 µF 16V
C108	ECEA0JKA470	Electrolytic	47 µF 6.3V (KA)
C110	ECEA1CKA100	Electrolytic	10 µF 16V
C111	ECEA0JKA221	Electrolytic	220 µF 6.3V (KA)
C112	ECEA1AKS470	Electrolytic	47 µF 10V
C113	ECEA0JKA330	Electrolytic	33 µF 6.3V
C114	ECEA1CSN4R7	Electrolytic	4.7 µF 16V
C115,116	YF400104FZT	Ceramic	0.1 µF
C117	ECEA0JKA221	Electrolytic	220 µF 6.3V (KA)
C118	ECEA1EKA4R7	Electrolytic	4.7 µF 25V
C119	YF426104XKS	Ceramic	0.1 µF

REF.NO.	PART NO.	DESCRIPTION	
C120	ECEA1ASN100	Electrolytic	10 µF 10V
C121	YF400104FZT	Ceramic	0.1 µF
C123	YF400104FZT	Ceramic	0.1 µF
C124	ECEA1AKS470	Electrolytic	47 µF 10V
C125	ECSF1CE475	Electrolytic	4.7 µF 16V
C126	ECSF1AE475	Electrolytic	4.7 µF 10V
C130	ECEA1ASN100	Electrolytic	10 µF 10V
C131-132	YF400470CHJT	Ceramic	47 pF
C133	YF400100CHJT	Ceramic	10 pF
C136,137	ECQB1H103JZ	Plastic	0.01 µF 50V
C138	ECSF1CE106	Electrolytic	10 µF 16V
C139	YW400102CHJT	Ceramic	1000 pF
C140,141	YF400104FZT	Ceramic	0.1 µF
C142	ECSF1CE475	Electrolytic	4.7 µF 16V
C143	YF400221CHJT	Ceramic	220 pF
C144	ECEA1ASN100	Electrolytic	10 µF 10V
C145	ECSF1AE475	Tantalum	47 µF 10V
C146	YF400270CHJT	Ceramic	27 pF
C147	ECEA1AKS470	Electrolytic	47 µF 10V
C150	ECSF1AE475	Tantalum	47 µF 10V
CT1-3	YWCDX20APS	Trimmer Capacitor	
DL1	ELB4D018	Delay Line	
L1,3	EL05SI100K	Coil	10 µH
L4-6	EL05SI100K	Coil	10 µH
L8	EIC5EB005A	Coil	
L9	EIS7EN029B	Coil	
SW1	YWSSS212B	Slide Switch	
SW2	YWSSS21200	Slide Switch	
X1	YWSC1773VC02	Crystal Oscillator	
X2	YWSC1773INT2	Crystal Oscillator	
X3	YWSC1406VC02	Crystal Oscillator	
CF1	YWELB4H046D	Filter	
CN1	FCN215Q050G0	50-pin Connector	
J5,44	YF21160R00T	Jumper Resistor	
J157,221	YF21160R00T	Jumper Resistor	
J237,239	YF21160R00T	Jumper Resistor	
J249,254	YF21160R00T	Jumper Resistor	
J258,264	YF21160R00T	Jumper Resistor	
J304	YF21160R00T	Jumper Resistor	
J308-310	YF21160R00T	Jumper Resistor	
TP1-11	YW32BM5A	Test pin	
TP13-15	YW32BM5A	Test pin	
TP17	YW32BM5A	Test pin	

REF.NO.	PART NO.	DESCRIPTION	
POWER / AUTO BOARD			
PCB7 (NLA)	YWVKCF70HE3A	Printed Circuit Board Assy	
IC1	YWD75108GE48	IC	
IC2	NJU4051BM	IC	
IC3	YWUPC4064G2	IC	
IC4	NJU4051BM	IC	
IC5	NJM2902M	IC	
IC6	NJU4053BM	IC	
IC7	NJM2901M	IC	
IC8	UPD6142G-101	IC	
IC9	YWBR93C46F	IC	
IC10	YWM51957BL	IC	
IC11,12	YWTL1451CNS	IC	
IC13	NJM2902M	IC	
Q2-4	2SB709-RS	Transistor	
Q5-12	2SD601-RS	Transistor	
Q14	2SB709-RS	Transistor	
Q15,17	2SD601-RS	Transistor	
Q18	2SB709-RS	Transistor	
Q19,20	2SD601-RS	Transistor	
Q21	2SB709-RS	Transistor	
Q22	2SD601-RS	Transistor	
Q23	2SB709-RS	Transistor	
Q24	2SJ132	Transistor	
Q26	2SA1244Y	Transistor	
Q27	2SD601-RS	Transistor	
Q28	2SB709-RS	Transistor	
Q29	2SA1244Y	Transistor	
Q30	2SD601-RS	Transistor	
Q31	2SC3074Y	Transistor	
Q32	2SB766A-QR	Transistor	
Q33,34	2SD601-RS	Transistor	
Q35	2SB709-RS	Transistor	
Q36,37	2SJ132	Transistor	
Q38	2SA1244Y	Transistor	
Q39,40	2SD601-RS	Transistor	
Q41	2SB709-RS	Transistor	
Q42	2SJ132	Transistor	
Q43	2SJ132	Transistor	
Q44	2SC3074Y	Transistor	
Q45,46	2SB709-RS	Transistor	
Q48	2SD601-RS	Transistor	
Q49-52	2SD601-RS	Transistor	
D1-3	MA151K	Diode	
D4	V03G	Diode	
D6-9	YWERA81004	Diode	
D11	YWERA81004	Diode	
D12	MA151K	Diode	
R1-8	YF2116101JT	Carbon	100 ohms 1/16W
R13,14	YFR1220P104D	Metal	100K ohms
R15,16	YF2116102GT	Carbon	1K ohms 1/16W
R17,18	YF2116222GT	Carbon	2.2K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R19	YWR1220P333D	Metal	33K ohms
R20	YWR1220P393D	Metal	39K ohms
R21	YWR1220P563D	Metal	56K ohms
R22	YF2116472GT	Carbon	4.7K ohms 1/16W
R23	YF2116104JT	Carbon	100K ohms 1/16W
R24	YWR1220P103D	Metal	10K ohms
R25	YWR1220P622D	Metal	6.2K ohms
R26,27	YF2116103JT	Carbon	10K ohms 1/16W
R28	YF2116223JT	Carbon	22K ohms 1/16W
R29	YF2116102GT	Carbon	1K ohms 1/16W
R30	YW2116105JT	Carbon	1M ohms 1/16W
R31,32	YF2116103JT	Carbon	10K ohms 1/16W
R33	YF2116223JT	Carbon	22K ohms 1/16W
R34	YF2116102GT	Carbon	1K ohms 1/16W
R35	YW2116105JT	Carbon	1M ohms 1/16W
R36	R1220P123D	Metal	12K ohms
R37	YFR1220P392D	Metal	3.9K ohms
R38-40	YW2116182JT	Carbon	1.8K ohms 1/16W
R41-43	YF2116222GT	Carbon	2.2K ohms 1/16W
R44,45	YF2116333GT	Carbon	33K ohms 1/16W
R46,47	YF2116332JT	Carbon	3.3K ohms 1/16W
R48,49	YF2116103JT	Carbon	10K ohms 1/16W
R50	YF2116224JT	Carbon	220K ohms 1/16W
R51,52	YF2116104JT	Carbon	100K ohms 1/16W
R53	YWR1220P682D	Metal	6.8K ohms
R54	YWR1220P102D	Metal	1K ohms
R55	YF2116562JT	Carbon	5.6K ohms 1/16W
R56	YF2116103JT	Carbon	10K ohms 1/16W
R57	YF2116102GT	Carbon	1K ohms 1/16W
R58	YF2116332JT	Carbon	3.3K ohms 1/16W
R59	YF2116104JT	Carbon	100K ohms 1/16W
R61	YF2116392JT	Carbon	3.9K ohms 1/16W
R62	YF2116393GT	Carbon	39K ohms 1/16W
R63,64	YF2116332JT	Carbon	3.3K ohms 1/16W
R65,66	YW2116182JT	Carbon	1.8K ohms 1/16W
R67	R1220P432D	Metal	4.3K ohms
R68	R1220P123D	Metal	12K ohms
R69	YF2116472GT	Carbon	4.7K ohms 1/16W
R71	YF2116223JT	Carbon	22K ohms 1/16W
R72	YF2116103JT	Carbon	10K ohms 1/16W
R73	YF2116472GT	Carbon	4.7K ohms 1/16W
R74-78	YF2116102GT	Carbon	1K ohms 1/16W
R79	YF2116104JT	Carbon	100K ohms 1/16W
R80,81	YF2116102GT	Carbon	1K ohms 1/16W
R82	YF2116103JT	Carbon	10K ohms 1/16W
R83	YF2116564JT	Carbon	560K ohms 1/16W
R84	YF2116823JT	Carbon	82K ohms 1/16W
R85	YF2116562JT	Carbon	5.6K ohms 1/16W
R86	YF2116474JT	Carbon	470K ohms 1/16W
R91	YF2116103JT	Carbon	10K ohms 1/16W
R92	YF2116104JT	Carbon	100K ohms 1/16W
R93	YF2116391JT	Carbon	390 ohms 1/16W
R94	YF2116512JT	Carbon	5.1K ohms 1/16W
R96	YF2116102GT	Carbon	1K ohms 1/16W
R97,98	YF2116392JT	Carbon	3.9K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R99	YF2116101JT	Carbon	100 ohms 1/16W
R100	YF2116471JT	Carbon	470 ohms 1/16W
R102	YF2116104JT	Carbon	100K ohms 1/16W
R103	YWR1220P753D	Metal	75K ohms
R104	YFR1220P104D	Metal	100K ohms
R105	YF2116125JT	Carbon	1.2M ohms 1/16W
R106	YWR1220P753D	Metal	75K ohms
R107	YF2116154GT	Carbon	150K ohms 1/16W
R108,109	YF2116562JT	Carbon	5.6K ohms 1/16W
R110	YF2116104JT	Carbon	100K ohms 1/16W
R112	YF2116683GT	Carbon	68K ohms 1/16W
R113	YF2116273GT	Carbon	27K ohms 1/16W
R114	YF2116682JT	Carbon	6,8K ohms 1/16W
R115	YF2116432JT	Carbon	4.3K ohms 1/16W
R116	YF2116562JT	Carbon	5.6K ohms 1/16W
R117	YF2116392JT	Carbon	3.9K ohms 1/16W
R118	YF2116101JT	Carbon	100 ohms 1/16W
R119,120	YF2116103JT	Carbon	10K ohms 1/16W
R122	YF2116104JT	Carbon	100K ohms 1/16W
R123	YF2116103JT	Carbon	10K ohms 1/16W
R128	YF2116100JT	Carbon	10 ohms 1/16W
R129	YF2116751JT	Carbon	750 ohms 1/16W
R130	YWR1220P223D	Metal	22K ohms
R131	YF2116470JT	Carbon	47 ohms 1/16W
R132	YFR1220P392D	Metal	3.9K ohms
R133	YF2116101JT	Carbon	100 ohms 1/16W
R134	YWR1220P223D	Metal	22K ohms
R135	YF2116271JT	Carbon	270 ohms 1/16W
R136	YFR1220P392D	Metal	3.9K ohms
R137	YF2116681JT	Carbon	680 ohms 1/16W
R138,139	YF2116332JT	Carbon	3.3K ohms 1/16W
R140	YF2116681JT	Carbon	680 ohms 1/16W
R141	YF2116221JT	Carbon	220 ohms 1/16W
R142,143	YW2116182JT	Carbon	1.8K ohms 1/16W
R144	YF2116181JT	Carbon	180 ohms 1/16W
R145	YWR1220P333D	Metal	33K ohms
R146	YF2116122JT	Carbon	1.2K ohms 1/16W
R147	YWR1220P332D	Metal	3.3K ohms
R148	YF2116471JT	Carbon	470 ohms 1/16W
R149	YWR1220P333D	Metal	33K ohms
R151	YWR1220P332D	Metal	3.3K ohms
R152	YF2116102GT	Carbon	1K ohms 1/16W
R153	YF2116103JT	Carbon	10K ohms 1/16W
R158,160	YF2116100JT	Carbon	10 ohms 1/16W
R161	YWR1220P153D	Metal	15K ohms
R162	YWR1220P512D	Metal	5.1K ohms
R163	YF2116101JT	Carbon	100 ohms 1/16W
R164	YWR1220P153D	Metal	15K ohms
R165	YF2116751JT	Carbon	750 ohms 1/16W
R166	YWR1220P512D	Metal	5.1K ohms
R168	YF2116103JT	Carbon	10K ohms 1/16W
R172,173	YF2116100JT	Carbon	10 ohms 1/16W
R174	YF2116361JT	Carbon	360 ohms 1/16W
R175	YWR1220P163D	Metal	16K ohms
R176	YWR1220P622D	Metal	6.2K ohms
R177	YF2116101JT	Carbon	100 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R178	YWR1220P183D	Metal 18K ohms
R179	YF2116471JT	Carbon 470 ohms 1/16W
R180	YWR1220P622D	Metal 6.2K ohms
R182,183	YF2116393GT	Carbon 39K ohms 1/16W
R185-188	YF2116393GT	Carbon 39K ohms 1/16W
R189	YF2116823JT	Carbon 82K ohms 1/16W
R190,191	YF2116393GT	Carbon 39K ohms 1/16W
VR1,2	EVML1GA00B14	Variable Resistor 10K ohms
VR3	EVML3GA00B52	Variable Resistor 500 ohms
VR4	EVML3GA00B24	Variable Resistor 20K ohms
Z1	YWRKM10L503F	Block Resistor
C1-4	YF400103XKT	Ceramic 0.01 µF
C5	ECEA0JS470	Electrolytic 47 µF 6.3V
C6,7	YF400330CHJT	Ceramic 33 pF
C8	ECEA1HK010	Electrolytic 1 µF 50V
C9	ECEA1HKS3R3	Electrolytic 3.3 µF 50V (KS)
C10	ECEA0JS470	Electrolytic 47 µF 6.3V
C11	ECEA1HK010	Electrolytic 1 µF 50V
C12	ECEA1HKS3R3	Electrolytic 3.3 µF 50V (KS)
C13,14	YF426104XKS	Ceramic 0.1 µF
C15,16	ECSF1CE105	Tantalum 1 µF 16V
C17	ECEA0JS470	Electrolytic 47 µF 6.3V
C18	YF400200CHJT	Ceramic 20 pF
C19	ECEA0JS470	Electrolytic 47 µF 6.3V
C20	ECEA0JS102	Electrolytic 1000 µF 6.3V
C21	YF400103XKT	Ceramic 0.01 µF
C22	YF400223XKT	Ceramic 0.022 µF
C23	YF400102XKT	Ceramic 1000 pF
C24	ECSF1VE334	Electrolytic 0.33 µF 35V
C25,26	YF400683XKT	Ceramic 0.068 µF XK
C27	ECSF1VE334	Tantalum 0.33 µF 35V
C28,29	YF400103XKT	Ceramic 0.01 µF
C30	ECSF1CE475	Tantalum 4,7 µF 16V
C31	YF4001101CHJT	Ceramic 100 pF
C32	YF400681CHJT	Ceramic 680 µF 50V
C33	YF400103XKT	Ceramic 0.01 µF
C34,35	YF400683XKT	Ceramic 0.068 µF XK
C36	ECSF1VE334	Tantalum 0.33 µF 35V
C37,38	ECA1CFZ221	Electrolytic 220 µF 16V
C39	ECA1CFZ151	Electrolytic 150 µF 16V
C40	ECEA1HKSR47	Electrolytic 0.47 µF 50V (KS)
C41	ECEA1AKA221	Electrolytic 220 µF 10V
C42	ECA1EFZ820	Electrolytic 82 µF 25V
C43	ECA1EFZ121	Electrolytic 120 µF 25V
C44	ECEA1HKSR47	Electrolytic 0.47 µF 50V (KS)
C45	ECEA1CKA101	Electrolytic 100 µF 16V
C46,47	ECA0JFZ331	Electrolytic 330 µF 6.3V
C48	ECEA1HKSR47	Electrolytic 0.47 µF 50V (KS)
C49	ECEA0JU471	Electrolytic 470 µF 6.3V
C50	ECA1CFZ221	Electrolytic 220 µF 16V
C51,52	ECA1AFZ221	Electrolytic 220 µF 10V
C53	ECEA1HKSR47	Electrolytic 0.47 µF 50V (KS)
C54	ECEA1CKS100	Electrolytic 10 µF 16V
C55	ECA1AFZ331	Electrolytic 330 µF 10V

REF.NO.	PART NO.	DESCRIPTION
C56	YF400103XKT	Ceramic 0.01 µF
C57	ECEA0JK220	Electrolytic 22 µF 6.3V
C58	YF400330CHJT	Ceramic 33 pF
C59	YF400223XKT	Ceramic 0,022 µF
C60	YF400101CHJT	Ceramic 100 pF
C61	YF400104FZT	Ceramic 0.1 µF
C62	YF400103XKT	Ceramic 0.01 µF
C63	YF400473FZT	Ceramic 0.047 µF
C64	YF400103XKT	Ceramic 0.01 µF
C65	ECEA1CU222	Electrolytic 2200 µF 16V
CT1	YWCDX20APS	Trimmer Capacitor
L1	YWNL32100K	Coil 10 µH
L2,3	YWNL32T560K	Coil 56 µH
L4,5	S100434470K	Coil 47 µH
L6	S100434561K	Coil 560 µH
L7	S100434470K	Coil 47 µH
L8	S100434101K	Coil 100 µH
L9,10	S100434470K	Coil 47 µH
L11	S100434221K	Coil 220 µH
L12	S100434470K	Coil 47 µH
SW1	YWSKHHLN	Special Switch
X1	YWKBR4R19MS	Crystal Oscillator
CN1	FCN215Q050G0	Connector
E1-4	YW32BM5A	Terminal
J111	YF2116R00T	Jumper Resistor
M129	YWV2HA0711A3	Shield Cover for Power

MOTHER BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB8 (NLA)	YWVKYF70HE1A	Printed Circuit Board Assy
IC1,2	NJU4053BM	IC
IC3	NJU4052BM	IC
IC4	MN4050BS	IC
IC5	YWNJM78L05UA	IC
IC6	YWUPC4064G2	IC
IC7	NJU4053BM	IC
IC8	YWNJU4538BM	IC
IC9	NJM2903M	IC
IC10	NJU4053BM	IC
IC11	YWTC4S66FR	IC
IC12	NJU4053BM	IC
IC13	YWTC4S66FR	IC
Q1	2SB709-RS	Transistor
Q2	2SB710-QRS	Transistor
Q3,5	2SD601-RS	Transistor
Q6,7	2SD601-RS	Transistor
Q8	2SB709-RS	Transistor
Q9	2SD601-RS	Transistor
Q10	2SB709-RS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q11	2SD601-RS	Transistor	
Q12	2SB709-RS	Transistor	
Q13	2SB793-RS	Transistor	
Q14	2SB709-RS	Transistor	
Q15-19	2SD601-RS	Transistor	
Q21-26	2SD601-RS	Transistor	
Q27	2SB709-RS	Transistor	
Q29	2SD601-RS	Transistor	
D1	LN11WP23	LED	
D2	MA4082M	Diode	
D3	MA151WK	Diode	
D4	MA4082M	Diode	
D8-14	MA151K	Diode	
D15	MA4082M	Diode	
D16,17	MA151K	Diode	
D18	MA4091M	Diode	
R1	YF2116562JT	Carbon	5.6K ohms 1/16W
R2	YF2116563JT	Carbon	56K ohms 1/16W
R3	ERJ8GCSG821	Metal	820 ohms 1/8W
R4	ERJ8GCSG122	Metal	1.2K ohms 1/8W
R5	ERJ8GCSJ222	Metal	2.2K ohms 1/8W
R6	YF2116104JT	Carbon	100K ohms 1/16W
R7	YF2116103JT	Carbon	10K ohms 1/16W
R8,9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YF2116103JT	Carbon	10K ohms 1/16W
R11	YF2116102GT	Carbon	1K ohms 1/16W
R12	YF2116474JT	Carbon	470K ohms 1/16W
R14	YF2116103JT	Carbon	10K ohms 1/16W
R15	YF2116104JT	Carbon	100K ohms 1/16W
R16	YF2116103JT	Carbon	10K ohms 1/16W
R17	YF2116223JT	Carbon	22K ohms 1/16W
R18-21	YF2116102GT	Carbon	1K ohms 1/16W
R22	YF2116333GT	Carbon	33K ohms 1/16W
R23,24	YF2116102GT	Carbon	1K ohms 1/16W
R25,28	YF2116333GT	Carbon	33K ohms 1/16W
R29	YF2116333GT	Carbon	33K ohms 1/16W
R30	YF2116222GT	Carbon	2.2K ohms 1/16W
R32	YF2116333GT	Carbon	33K ohms 1/16W
R33	YF2116103JT	Carbon	10K ohms 1/16W
R34	YF2116104JT	Carbon	100K ohms 1/16W
R35	YF2116392JT	Carbon	3.9K ohms 1/16W
R36	YF2116223JT	Carbon	22K ohms 1/16W
R37	YF2116472GT	Carbon	4.7K ohms 1/16W
R38	YF2116102GT	Carbon	1K ohms 1/16W
R39	YF2116563JT	Carbon	56K ohms 1/16W
R40	YF2116102GT	Carbon	1K ohms 1/16W
R41	YF2116472GT	Carbon	4.7K ohms 1/16W
R42,43	YF2116393GT	Carbon	39K ohms 1/16W
R44	YF2116333GT	Carbon	33K ohms 1/16W
R45	YF2116103JT	Carbon	10K ohms 1/16W
R46	YF2116473GT	Carbon	47K ohms 1/16W
R47	YF2116333GT	Carbon	33K ohms 1/16W
R48	YF2116103JT	Carbon	10K ohms 1/16W
R49	YF2116473GT	Carbon	47K ohms 1/16W
R50	YF2116104JT	Carbon	100K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R51	YF2116473GT	Carbon	47K ohms 1/16W
R52	YF2116471JT	Carbon	470 ohms 1/16W
R54	ERJ8GCSG101	Metal	100 ohms 1/8W
R56	YF2116102GT	Carbon	1K ohms 1/16W
R58-60	YF2116103JT	Carbon	10K ohms 1/16W
R61	YF2116472GT	Carbon	4.7K ohms 1/16W
R62	YW2116105JT	Carbon	1M ohms 1/16W
R63	YF2116624JT	Carbon	620K ohms 1/16W
R64	YF2116152JT	Carbon	1.5K ohms 1/16W
R65	YF2116751JT	Carbon	750 ohms 1/16W
R66	YF2116181JT	Carbon	180 ohms 1/16W
R67	YF2116911JT	Carbon	910 ohms 1/16W
R68	YF2116563JT	Carbon	56K ohms 1/16W
R69	YF2116472GT	Carbon	4.7K ohms 1/16W
R70	YF2116912GT	Carbon	9.1K ohms 1/16W
R71	YF2116123JT	Carbon	12K ohms 1/16W
R72	YF2116223JT	Carbon	22K ohms 1/16W
R73	YF2116102GT	Carbon	1K ohms 1/16W
R74,75	YF2116222GT	Carbon	2.2K ohms 1/16W
R76	YF2116122JT	Carbon	1.2K ohms 1/16W
R77,78	YF2116103JT	Carbon	10K ohms 1/16W
R79	YF2116333GT	Carbon	33K ohms 1/16W
R80	YF2116123JT	Carbon	12K ohms 1/16W
R81	YF2116103JT	Carbon	10K ohms 1/16W
R82,83	YF2116104JT	Carbon	100K ohms 1/16W
R84	YF2116564JT	Carbon	560K ohms 1/16W
R85	YF2116103JT	Carbon	10K ohms 1/16W
R86	YF2116102GT	Carbon	1K ohms 1/16W
R87	YF2116473GT	Carbon	47K ohms 1/16W
R88	YF2116473GT	Carbon	47K ohms 1/16W
R89,90	YF2116104JT	Carbon	100K ohms 1/16W
R91	YF2116101JT	Carbon	100 ohms 1/16W
R92	YF2116473GT	Carbon	47K ohms 1/16W
R93	YF2116333GT	Carbon	33K ohms 1/16W
R94	YF2116102GT	Carbon	1K ohms 1/16W
R95	YF2116104JT	Carbon	100K ohms 1/16W
R96,97	YF2116224JT	Carbon	220K ohms 1/16W
R98-100	YF2116333GT	Carbon	33K ohms 1/16W
R101	YF2116104JT	Carbon	100K ohms 1/16W
R102	YW2116105JT	Carbon	1M ohms 1/16W
R103,104	YF2116103JT	Carbon	10K ohms 1/16W
R105	YF2116473GT	Carbon	47K ohms 1/16W
R106-108	YF2116563JT	Carbon	56K ohms 1/16W
R109,110	YF2116104JT	Carbon	100K ohms 1/16W
R112	YF2116104JT	Carbon	100K ohms 1/16W
R113	YF2116103JT	Carbon	10K ohms 1/16W
R114	YF2116474JT	Carbon	470K ohms 1/16W
R115	YF2116103JT	Carbon	10K ohms 1/16W
R116	YF2116474JT	Carbon	470K ohms 1/16W
R118-120	YF2116104JT	Carbon	100K ohms 1/16W
R122	YF2116104JT	Carbon	100K ohms 1/16W
R123,125	YF2116103JT	Carbon	10K ohms 1/16W
R126	YF2116473GT	Carbon	47K ohms 1/16W
R127-129	YF2116104JT	Carbon	100K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R130	YF2116222GT	Carbon	2.2K ohms 1/16W
R131	YF2116103JT	Carbon	10K ohms 1/16W
R132	YF2116392JT	Carbon	3.9K ohms 1/16W
R133	YW2116182JT	Carbon	1.8K ohms 1/16W
R134	YF2116822JT	Carbon	8.2K ohms 1/16W
R135	YF2116562JT	Carbon	5.6K ohms 1/16W
R136	YF2116392JT	Carbon	3.9K ohms 1/16W
R137	YW2116182JT	Carbon	1.8K ohms 1/16W
R138	YF2116683GT	Carbon	68K ohms 1/16W
R139	YF2116273GT	Carbon	27K ohms 1/16W
R140-143	YF2116104JT	Carbon	100K ohms 1/16W
R144,145	YF2116103JT	Carbon	10K ohms 1/16W
R146	YF2116473GT	Carbon	47K ohms 1/16W
R147	YF2116332JT	Carbon	3.3K ohms 1/16W
R148	YF2116333GT	Carbon	33K ohms 1/16W
R149,150	YF2116473GT	Carbon	47K ohms 1/16W
R152	YF2116103JT	Carbon	10K ohms 1/16W
R153	YF2116364JT	Carbon	360K ohms 1/16W
R154	YF2116224JT	Carbon	220K ohms 1/16W
R158	YF2116104JT	Carbon	100K ohms 1/16W
R159	YF2116102GT	Carbon	1K ohms 1/16W
R160	ERSB12J102	Metal	1K ohms
R163	YF2116102GT	Carbon	1K ohms 1/16W
R164	YF2116472GT	Carbon	4.7K ohms 1/16W
R165	YF2116273GT	Carbon	27K ohms 1/16W
R168	YF2116101JT	Carbon	100 ohms 1/16W
R170	YF2116222GT	Carbon	2.2K ohms 1/16W
R171	ERJ3GEY561	Metal	560 ohms 1/16W
VR1-3	EVMMAGA01B23	Variable Resistor	2K ohms
VR4,5	EVMMAGA01B14	Variable Resistor	10KB ohms
VR6	EVMMAGA01B13	Variable Resistor	1K ohms
VR7	EVML3GA00B54	Variable Resistor	50K ohms
VR8	EVML3GA00B53	Variable Resistor	5KB ohms
C1	ECEA1CKS470	Electrolytic	47 µF 16V
C2-4	YF400104FZT	Ceramic	0.1 µF
C5	ECEA1CKS470	Electrolytic	47 µF 16V
C6	YF400224FZT	Ceramic	0.22 µF
C7	ECEA0JS470	Electrolytic	47 µF 6.3V
C8,9	ECEA1CKK100	Electrolytic	10 µF 16V
C12	ECEA1AKA101	Electrolytic	100 µF 10V
C13	ECEA1EKA470	Electrolytic	47 µF 25V
C14	ECEA1AKS220	Electrolytic	22 µF 10V
C15	ECEA1VSN2R2	Electrolytic	2.2 µF 35V
C16,17	YW426334FZT	Ceramic	0.33 µF
C18	YF400104FZT	Ceramic	0.1 µF
C19	YF426104XKS	Ceramic	0.1 µF
C20	ECEA1HKK2R2	Electrolytic	2.2 µF 25V
C21	ECEA1AKK100	Electrolytic	10 µF 10V
C22	YF400103XKT	Ceramic	0.01 µF
C23	ECEA1CKS470	Electrolytic	47 µF 16V
C24	YF400224FZT	Ceramic	0.22 µF
C26	ECEA1CKS470	Electrolytic	47 µF 16V
C27	YF400224FZT	Ceramic	0.22 µF
C28	YF400104FZT	Ceramic	0.1 µF
C29,30	ECEA1AKK100	Electrolytic	10 µF 10V
C31	ECEA1CKK100	Electrolytic	10 µF 16V
C32	ECEA1EKS100	Electrolytic	10 µF 25V
C33	ECEA1AKK100	Electrolytic	10 µF 10V
C34	ECEA1HKK010	Electrolytic	1 µF 50V
C35	ECEA1CKK100	Electrolytic	10 µF 16V
C38	ECEA0JKA221	Electrolytic	220 µF 6.3V (KA)
C369	ECA1AFZ331	Electrolytic	330 µF 10V
SW1	YWSSSS922L4	Slide Switch	
SW2	YFSSS323L4	Slide Switch	
SW3	YFSPH222A	Push Switch	
SW4-8	YWSSSS922L4	Slide Switch	
SW9	YWSKHHBS	Push Switch	
CN1-4	FCN214J050G0	50-pin Connector	
CN5	FCN235P068GE	68-pin Connector	
CN6	EMCS1150Z	11-pin Connector	
CN7	EMCS1050Z	10-pin Connector	
CN8	EMCS1250Z	12-pin Connector	
CN9	EMCS0650ZL	6-pin Connector	
CN10	EMCS0650Z	6-pin Connector	
CN11	EMCS0550Z	5-pin Connector	
CN12	EMCS0250ZL	2-pin Connector	
TP1	YW32BM4R5	Test-pin	
E1	YWV3CA0176A4	LED Holder	

VIC 1,2,3 BOARD

PCB9-11	YWVKYF70HE3A	Printed Board	
C1	YWU21PH470J	Ceramic	47 pF
C2	YWU21PH181J	Ceramic	180 pF
C3	YWU21PH100J	Ceramic	10 pF
C4	YWU21PH181J	Ceramic	180 pF
C5	YWU21PH470J	Ceramic	47 pF
CF1	YWEIR5QB006Q	Filter	
CF2	YWEIR5QB007Q	Filter	
CF3	YWEIR5QB008Q	Filter	
CN1	YWJMI6LH4AAT	4-pin Connector	

CAMERA ADAPTOR

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
CF1	YWTRCC201010	Filter
CF2	YWTRCC201010	Filter
CF3	YW2643164151	Filter
CF4	YWTRCN281613	Filter
SW101	YWMTM7101G	Power Selection Switch
F101 ⚠	XBA2C31ET0A	Current Fuse 3.15A 250V
JK101	YWYAE329800A	Battery Jack
CN101	YFXLR432F512	External DC Input Connector
CN102,103	YWBNC-BRZ-1	BNC Connector
CN104	YWTCS7848101	S-VHS Video Output Connector
CN105	YFJMR2532M	VTR/RCU Connector
M61	YWV5EA0701A1	Main Cover
M62	YWV5EA0702B2	Rear Cover
M63	YWV5VA0058A2	Pad
M64	YWV2SA1405A4	Mounting Angle
M65	YFV2EB0028B4	Mounting Guide for Battery Pack
M66	YWVMP1044	Stopper Guide
M67	YWV2SA1404B4	Mounting Angle
M68	YWV2SA1408A4	Mounting Angle
M69	YWV2FA0354A4	Cushion
M70	YWV4JA0291A4	Spring
M71	YWV5EA0703A1	ADP Operation Cover
M72	YWV6GA0129A3	Switch Cover Plate
M73	YWV4JA0286A4	Spring
M74	YWV4HA0123A4	Shaft
M75	YWV2SA1419A4	Mounting Angle
M76	YWV2SA1420A4	Mounting Angle
M77	YWV5RA0250A3	Audio Knob
M78	YWV6GA0130A4	Plate
M79	YFV2SA0200B4	Mounting Angle
M80	YFA2PA0053B4	Insulator
M81	YWA2PA0054A4	Washer
M82	YFV7MA0207A4	Safety Label
M84	YWV7QA1875A4	Main Label
M85	YWV7SA0978A2	Label
M86	YFV7MA0099A4	Safety Label
M87	YWV7SA0977A4	Label

68-PIN CONNECTOR BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB15	YWVRYAD70E1A	Printed Board
CN1	FCN234J068GZ	68-pin Connector
J1	ERDS2TC0	Jumper Resistor
M88	YWV2NA0274A4	Spacer

MAIN BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB16 (NLA)	YWVKZAD70E2A	Printed Circuit Board Assy
IC1,2	MN4023BS	IC
IC3	YWM51957BL	IC
IC4,5	NJM2903M	IC
IC6	NJM2904M	IC
IC7	YWNJM387D	IC
IC8	NJU4053BM	IC
IC9	YFNJM386D	IC
IC10	M5231L	IC
IC11	YWNJU4538BM	IC
IC12-15	YWUPC4064G2	IC
IC16	MN4050BS	IC
IC17,18	NJU4051BM	IC
IC19	MN4071BS	IC
IC20	MN4011BS	IC
IC21	YWUPC4062G2	IC
IC22	MN4050BS	IC
IC24	TP4508NP	IC
IC25	M46015	IC
IC26	NJM2904M	IC
IC27	TL7700CPS	IC
IC28	YWNJM2244M	IC
IC29	YWNJM2243M	IC
IC30	YWNJM2244M	IC
IC31,32	NJU4053BM	IC
IC33	NJM2903M	IC
Q1	2SB709-RS	Transistor
Q2-6	2SD601-RS	Transistor
Q7	2SB709-RS	Transistor
Q8	2SD602-QRS	Transistor
Q9	2SD601-RS	Transistor
Q10,11	2SD602-QRS	Transistor
Q12	2SB793-RS	Transistor
Q13	2SD601-RS	Transistor
Q14,15	2SB709-RS	Transistor
Q16,17	2SD601-RS	Transistor
Q18	2SB793-RS	Transistor
Q19-28	2SD601-RS	Transistor
Q29	2SB709-RS	Transistor
Q30-38	2SD601-RS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q39	2SB709-RS	Transistor	
Q40,44	2SD601-RS	Transistor	
Q45	2SB709-RS	Transistor	
Q46	2SD601-RS	Transistor	
Q47	2SB709-RS	Transistor	
Q51,52	2SD601-RS	Transistor	
D1,2	YWERA81004	Diode	
D3	MA151K	Diode	
D4	MA151WK	Diode	
D6	MA151K	Diode	
D7	MA4091M	Diode	
R1	ERJ3GEYJ223	Metal	22K ohms 1/16W
R2	ERJ3GEYJ473	Metal	47K ohms 1/16W
R3	ERJ3GEYJ104	Metal	100K ohms 1/16W
R4	ERJ3GEYJ103	Metal	10K ohms 1/16W
R5	ERJ3GEYJ473	Metal	47K ohms 1/16W
R6	ERJ3GEYJ103	Metal	10K ohms 1/16W
R7,8	ERJ3GEYJ223	Metal	22K ohms 1/16W
R9,10	ERJ3GEYJ473	Metal	47K ohms 1/16W
R11	ERJ3GEYJ103	Metal	10K ohms 1/16W
R12	ERJ3GEYJ104	Metal	100K ohms 1/16W
R13	ERJ3GEYJ223	Metal	22K ohms 1/16W
R14	ERJ3GEYJ104	Metal	100K ohms 1/16W
R15	ERJ3GEYJ223	Metal	22K ohms 1/16W
R16	ERJ3GEYJ104	Metal	100K ohms 1/16W
R17	ERJ3GEYJ103	Metal	10K ohms 1/16W
R18	ERJ3GEYJ133	Metal	13K ohms 1/16W
R19	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R20	ERJ3GEYJ473	Metal	47K ohms 1/16W
R21	ERJ3GEYJ163	Metal	16K ohms 1/16W
R22	ERJ3GEYJ203	Metal	20K ohms 1/16W
R23	ERJ3GEYJ103	Metal	10K ohms 1/16W
R24	ERJ3GEYJ683	Metal	68K ohms 1/16W
R25	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R26	ERJ3GEYJ683	Metal	68K ohms 1/16W
R27	ERJ3GEYJ563	Metal	56K ohms 1/16W
R28	ERJ3GEYJ104	Metal	100K ohms 1/16W
R29	ERJ3GEYJ334	Metal	330K 1/16W
R30	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R31	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R32	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R33	ERJ3GEYJ103	Metal	10K ohms 1/16W
R34-36	ERJ3GEYJ104	Metal	100K ohms 1/16W
R37	ERJ3GEYJ154	Metal	150K ohms 1/16W
R38	ERJ3GEYJ123	Metal	12K ohms 1/16W
R39	ERJ3GEYJ683	Metal	68K ohms 1/16W
R40	ERJ3GEYJ154	Metal	150K ohms 1/16W
R41	ERJ3GEYJ563	Metal	56K ohms 1/16W
R42	ERJ3GEYJ103	Metal	10K ohms 1/16W
R43	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R44	ERDS2TJ102	Carbon	1K ohms 1/4W
R45	ERDS2FJ221	Carbon	220 ohms 1/4W
R46,47	ERJ3GEYJ223	Metal	22K ohms 1/16W
R48	ERJ3GEYJ392	Metal	3.9K ohms 1/16W
R49	ERDS2TJ100	Carbon	10 ohms 1/4W

REF.NO.	PART NO.	DESCRIPTION	
R50	ERJ3GEYJ113	Metal	11K ohms 1/16W
R51	ERJ3GEYJ821	Metal	820 ohms 1/16W
R52	ERJ3GEYJ102	Metal	1K ohms 1/16W
R53	ERJ3GEYJ471	Metal	470 ohms 1/16W
R54	ERJ3GEYJ103	Metal	10K ohms 1/16W
R55	ERJ3GEYJ123	Metal	12K ohms 1/16W
R56	ERJ3GEYJ103	Metal	10K ohms 1/16W
R57	ERJ3GEYJ102	Metal	1K ohms 1/16W
R58	ERJ3GEYJ471	Metal	470 ohms 1/16W
R59	ERJ3GEYJ102	Metal	1K ohms 1/16W
R60	ERJ3GEYJ471	Metal	470 ohms 1/16W
R61	ERDS2TJ330	Carbon	33 ohms 1/4W
R62	ERJ3GEYJ184	Metal	180K ohms 1/16W
R63	ERJ3GEYJ102	Metal	1K ohms 1/16W
R64,65	ERJ3GEYJ334	Metal	330K 1/16W
R66	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R67	ERJ3GEYJ562	Metal	5.6K ohms 1/16W
R68	ERJ3GEYJ124	Metal	120K ohms 1/16W
R69	ERJ3GEYJ303	Metal	30K ohms 1/16W
R70	ERJ3GEYJ274	Metal	270K ohms 1/16W
R71	ERJ3GEYJ100	Metal	10 ohms 1/16W
R72	ERJ3GEYJ104	Metal	100K ohms 1/16W
R73,74	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R75	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R76	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R77	ERJ3GEYJ104	Metal	100K ohms 1/16W
R78	ERJ3GEYJ333	Metal	33K ohms 1/16W
R79	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R81-83	ERJ3GEYJ103	Metal	10K ohms 1/16W
R84	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R85	ERJ3GEYJ822	Metal	8.2K ohms 1/16W
R86	ERJ3GEYJ102	Metal	1K ohms 1/16W
R87	ERJ3GEYJ331	Metal	330 ohms 1/16W
R88	ERJ3GEYJ561	Metal	560 ohms 1/16W
R89	ERJ3GEYJ102	Metal	1K ohms 1/16W
R90-92	ERJ3GEYJ103	Metal	10K ohms 1/16W
R93	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R94	ERJ3GEYJ105	Metal	1M ohms 1/16W
R95-97	YFR1220P203D	Metal	20K ohms
R98	YFR1220P392D	Metal	3.9K ohms
R99-101	YFR1220P203D	Metal	20K ohms
R102	YFR1220P104D	Metal	100K ohms
R103-106	YWR1220P103D	Metal	10K ohms
R108-111	YFR1220P203D	Metal	20K ohms
R112,113	YWR1220P103D	Metal	10K ohms
R119-129	ERJ3GEYJ103	Metal	10K ohms 1/16W
R130	ERJ3GEYJ104	Metal	100K ohms 1/16W
R131	ERJ3GEYJ103	Metal	10K ohms 1/16W
R132	ERJ3GEYJ104	Metal	100K ohms 1/16W
R133,134	ERJ3GEYJ103	Metal	10K ohms 1/16W
R135	ERJ3GEYJ123	Metal	12K ohms 1/16W
R136	ERJ3GEYJ153	Metal	15K ohms 1/16W
R137	ERJ3GEYJ103	Metal	10K ohms 1/16W
R138,139	YWR1220P563D	Metal	56K ohms

REF.NO.	PART NO.	DESCRIPTION	
R140	YWR1220P393D	Metal	39K ohms
R141	ERJ3GEYJ563	Metal	56K ohms 1/16W
R142	ERJ3GEYJ561	Metal	560 ohms 1/16W
R143	ERJ3GEYJ223	Metal	22K ohms 1/16W
R144-146	ERJ3GEYJ103	Metal	10K ohms 1/16W
R147	YWR1220P303D	Metal	30K ohms
R148,149	YWR1220P202D	Metal	2K ohms
R152	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R153	ERJ3GEYJ103	Metal	10K ohms 1/16W
R154	YWR1220P102D	Metal	1K ohms
R155	YWR1220P242D	Metal	2.4K ohms
R156	YWR1220P512D	Metal	5.1K ohms
R157	R1220P822D	Metal	8.2K ohms
R158	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R159	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R160	ERJ3GEYJ223	Metal	22K ohms 1/16W
R161	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R162	ERJ3GEYJ103	Metal	10K ohms 1/16W
R163	YWR1220P102D	Metal	1K ohms
R164	YWR1220P911D	Metal	910 ohms
R165	YWR1220P202D	Metal	2K ohms
R166	YFR1220P392D	Metal	3.9K ohms
R167	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R168	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R169	ERJ3GEYJ223	Metal	22K ohms 1/16W
R170	YWR1220P512D	Metal	5.1K ohms
R171	ERJ3GEYJ301	Metal	300 ohms 1/16W
R172	YFR1220P392D	Metal	3.9K ohms
R173	ERJ3GEYJ821	Metal	820 ohms 1/16W
R174	YWR1220P562D	Metal	5.6K ohms
R175	YWR1220P512D	Metal	5.1K ohms
R176	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R177	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R178	ERJ3GEYJ223	Metal	22K ohms 1/16W
R186	ERJ3GEYJ104	Metal	100K ohms 1/16W
R187	ERJ3GEYJ102	Metal	1K ohms 1/16W
R188	ERJ3GEYJ104	Metal	100K ohms 1/16W
R189	ERJ3GEYJ750	Metal	75 ohms 1/16W
R190	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R191	ERJ3GEYJ102	Metal	1K ohms 1/16W
R192	ERJ3GEYJ472	Metal	4.7K ohms 1/16W
R193	ERJ3GEYJ104	Metal	100K ohms 1/16W
R194	ERJ3GEYJ303	Metal	30K ohms 1/16W
R195	ERJ3GEYJ153	Metal	15K ohms 1/16W
R196	ERJ3GEYJ102	Metal	1K ohms 1/16W
R197	ERJ3GEYJ223	Metal	22K ohms 1/16W
R198	ERJ3GEYJ680	Metal	68 ohms 1/16W
R199	ERJ3GEYJ102	Metal	1K ohms 1/16W
R202	ERJ3GEYJ273	Metal	27K ohms 1/16W
R203	ERJ3GEYJ183	Metal	18K ohms 1/16W
R204-206	ERJ3GEYJ222	Metal	2.2K ohms 1/16W
R208	ERJ3GEYJ183	Metal	18K ohms 1/16W
R209	ERJ3GEYJ822	Metal	8.2K ohms 1/16W
R210	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R211,212	ERJ3GEYJ102	Metal	1K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R213	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R214	ERJ3GEYJ680	Metal	68 ohms 1/16W
R215	ERJ3GEYJ183	Metal	18K ohms 1/16W
R216	ERJ3GEYJ822	Metal	8.2K ohms 1/16W
R217	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R218,219	ERJ3GEYJ102	Metal	1K ohms 1/16W
R220	ERJ3GEYJ152	Metal	1.5K ohms 1/16W
R221	ERJ3GEYJ680	Metal	68 ohms 1/16W
R231	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
R237,238	ERJ3GEYJ103	Metal	10K ohms 1/16W
R239	ERJ3GEYJ473	Metal	47K ohms 1/16W
R240	ERJ3GEYJ682	Metal	6.8K ohms 1/16W
R241	ERJ3GEYJ332	Metal	3.3K ohms 1/16W
VR1	EVML3GA00B23	Variable Resistor	2K ohms
Z1	YFRKM10L104F	Block Resistor	
C1	YW5F104Z2VB	Ceramic	0.1 μF
C2,3	YW5X102K5VB	Ceramic	1000 pF
C4	ECEA1CKA100	Electrolytic	10 μF 16V
C5	ECEA1CKS470	Electrolytic	47 μF 16V
C6	ECEA1CKA100	Electrolytic	10 μF 16V
C7	ECEA1CKS470	Electrolytic	47 μF 16V
C8	ECEA1HKA010	Electrolytic	1 μF 50V
C9	ECEA1AKA101	Electrolytic	100 μF 10V
C10	ECEA1EKA470	Electrolytic	47 μF 25V
C11	YW5F104Z2VB	Ceramic	0.1 μF
C12	ECEA1CKN100	Electrolytic	10 μF 16V
C13	ECEA1CS102	Electrolytic	1000 μF 16V
C14	ECEA1CKA101	Electrolytic	100 μF 16V
C15	ECEA1HKA010	Electrolytic	1 μF 50V
C16	YW5CH101J5VB	Ceramic	100 pF
C17	YW5CH331J5VB	Ceramic	330 pF
C18	ECEA1CU471	Electrolytic	470 μF 16V
C19	ECEA1HKA010	Electrolytic	1 μF 50V
C20	ECEA1AKS470	Electrolytic	47 μF 10V
C21	ECEA1AKN470	Electrolytic	47 μF 10V
C22	ECEA1HKNR47	Electrolytic	0.47 μF 50V
C23	YW5CH101J5VB	Ceramic	100 pF
C24	ECEA1HKA010	Electrolytic	1 μF 50V
C25	ECEA1AKN470	Electrolytic	47 μF 10V
C26	ECEA1CU222	Electrolytic	2200 μF 16V
C27	YW5F473Z2VB	Ceramic	0.047 μF
C28,29	ECEA1AKS470	Electrolytic	47 μF 10V
C30,31	ECEA1CKS470	Electrolytic	47 μF 16V
C32	ECEA1HKA010	Electrolytic	1 μF 50V
C33	ECEA1EKA470	Electrolytic	47 μF 25V
C34	YW5F104Z2VB	Ceramic	0.1 μF
C35	ECEA1HKA010	Electrolytic	1 μF 50V
C36,37	ECEA1CKS470	Electrolytic	47 μF 16V
C38	ECEA1AKS470	Electrolytic	47 μF 10V
C39-45	ECQM1H104JZ	Plastic	0.1 μF 50V
C46-48	YW5F104Z2VB	Ceramic	0.1 μF
C49,50	ECQM1H104JZ	Plastic	0.1 μF 50V
C51-53	YW5F104Z2VB	Ceramic	0.1 μF
C54	ECEA1CKS470	Electrolytic	47 μF 16V
C55	ECEA1AKS470	Electrolytic	47 μF 10V

REF.NO.	PART NO.	DESCRIPTION
C56	ECEA1HKA010	Electrolytic 1 µF 50V
C57	YW5F104Z2VB	Ceramic 0.1 µF
C58,59	ECEA1CKS470	Electrolytic 47 µF 16V
C60	YW5F104Z2VB	Ceramic 0.1 µF
C61	ECEA1CKA100	Electrolytic 10 µF 16V
C62	YW5CH151J5VB	Ceramic 150 pF
C63	YW5CH470J5VB	Ceramic 47 pF
C64	ECEA1CKS470	Electrolytic 47 µF 16V
C65	ECQM1H104JZ	Plastic 0.1 µF 50V
C66,67	ECEA1CKS470	Electrolytic 47 µF 16V
C69	ECEA1CKN100	Electrolytic 10 µF 16V
C70,71	ECEA1AU222	Electrolytic 2200 µF 10V
C73	ECEA1CKN100	Electrolytic 10 µF 16V
C74	ECEA1AKA221	Electrolytic 220 µF 10V
C76	ECEA1HKA0R1	Electrolytic 0.1 µF 50V
C77	ECEA1CKN100	Electrolytic 10 µF 16V
C78,79	ECEA1AU222	Electrolytic 2200 µF 10V
C80	ECEA1EKN3R3	Electrolytic 3.3 µF 25V
C81,82	ECEA1AKS470	Electrolytic 47 µF 10V
C83	ECEA1CKS470	Electrolytic 47 µF 16V
C84	ECEA1CKN100	Electrolytic 10 µF 16V
C85,86	ECEA1CKS470	Electrolytic 47 µF 16V
C87-88	ECEA1AKN470	Electrolytic 47 µF 10V
C93	YW5CH331J5VB	Ceramic 330 pF
C95	ECQM1H333KZ	Plastic 0.033 µF 50V
C96	ECQM1H104JZ	Plastic 0.1 µF 50V
C97	ECEA1CKA101	Electrolytic 100 µF 16V
C98,99	ECEA1AKN470	Electrolytic 47 µF 10V
X1	YFCSB500EG	Oscillator
J4	ERJ3GEY0R00	Jumper Resistor
CN1	FCN215Q060G0	60-pin Connector
CN2	EMCS0750Z	7-pin Connector
CN3	EMCS0850Z	8-pin Connector
CN4	EMCS1250Z	12-pin Connector
CN5	EMCS0550Z	5-pin Connector
CN6	EMCS0750Z	7-pin Connector
CN7	EMCS0450Z	4-pin Connector
TP1,2	YW32BM12R5	Test-pin

MOTHER BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB17 (NLA)	YWVKZAD70E1A	Printed Circuit Board Assy
R80	ERDS2TJ100	Carbon 10 ohms 1/4W
R179-183	ERDS2TJ680	Carbon 68 ohms1/4W
R207	ERDS2TJ102	Carbon 1K ohms 1/4W
R229	ERDS2TJ750	Carbon 75 ohms 1/4W
CB1	TBC50310921	Braker
CN1	FCN214J060G0	60-pin Connector
CN2	EMCS0650Z	6-pin Connector
CN3	EMCS0450Z	4-pin Connector
CN4	EMCS1250Z	12-pin Connector

REF.NO.	PART NO.	DESCRIPTION
CN5	EMCS1050Z	10-pin Connector
CN6	EMCS0250Z	2-pin Connector
CN7	EMCS0750Z	7-pin Connector
CN8	EMCS0250Z	2-pin Connector
CN9	EMCS1150Z	11-pin Connector
CN10	EMCS0450Z	4-pin Connector
CN11	EMCS1350Z	13-pin Connector
CN12	EMCS1250Z	12-pin Connector
CN13	EMCS1050Z	10-pin Connector
E1	YWSN5053	Fuse Holder
M89	YWV2SA1406A4	Mounting Angle

SWITCH BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB18	YWVRZAD70E4A	Printed Board
SW1-3	YWSSSS922L4	Slide Switch
SW4	YFSSS323L4	Slide Switch

AUDIO BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB19 (NLA)	YWVKZAD70E3A	Printed Circuit Board Assy
D1	LN21RPH	LED Red
R1	ERDS2FJ331	Carbon 330 ohms 1/4W
R2	ERDS2TJ753	Carbon 75K ohms 1/4W
VR1	EVJVJAF15B23	Variable Resistor 2KB ohms
JK1	YWLJ23083080	Jack
JK2	YWHSJ0912050	Jack
E1	YWA3CA0052A4	LED Holder

ACCESSORY PARTS/PACKAGING PARTS for WV-F70H

REF.NO.	PART NO.	DESCRIPTION
M141	YWV8QA1764AN	Operating Instructions
M142	YWV8RA0233A4	Coution Label
M143	XZB26X40C05	Polyethylene Bag for Printed
M144	XZB45X63C05	Polyethylene Bag
M148	YWV9CA1282AN	Packaging

REF.NO.	PART NO.	DESCRIPTION

12X SERVO CONTROL ZOOM LENS

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
VR101	YW704968A	Iris Control assy
SW101	YW704967A	VTR Switch Assy
SW102	YW106035A	Ret/Rec Check Assy
MO101	YW704912A	Iris Motor Assy
MO102	YW704913A	Zoom Motor Assy
E101	YW704974A	12-pin Connector Cable Assy
M1	YFV6BA0022A3	Hood
M2	YFV5GA0042A3	Hood Cap
M3	YW401776	Rear Cap
M4	YW704902	Grip Cover
M5	YF614039	Cap for Control
M6	YW704929	Main Label
M8	YW704928	Mounting Angle for Zoom Case
M9	YFV6JA0026A4	Button for FA
M10	YW704932A	Zoom Case Assy
M12	YW704925	Zoom Change Knob
M13	YW704926	Zoom Change Knob Cover
M14	YW401701A	Lens Assy
M15	YW401747	Focus Band
M16	YW401748	Macro Band
M17	YW401749	Zooming Lever
M18	YW401745	Clamp Ring
M19	YW401744	Lens Mount
M20	YW401746	Clamp Ring Guide
M21	YFV5YA0020B3	Grip Band

MAIN BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB1 (NLA)	YW704962A	Printed Circuit Board Assy
IC1	NJM2902M	IC
IC2	BA6218	IC
IC3	NJM2903M	IC
IC4	NJM2902M	IC
IC5	NJM4558M	IC
IC6	NJM4556M	IC
IC7	MN400IBS	IC
Q1	2SK160-K6	Transistor
Q2	2SD874-RS	Transistor
Q3	2SB710-QRS	Transistor
Q4-10	2SD601A-QR	Transistor
D1	MA3100-L	Diode
D2	MA151K	Diode
D3	MA151WK	Diode
D4,5	MA151K	Diode
D6	MA157	Diode
D7	MA151WA	Diode
D8	MA157	Diode
D9	MA151WK	Diode
D10	MA151K	Diode
D11	MA3082-M	Diode
D12-14	MA157	Diode
R1	ERJ6GEYJ100	Carbon 10 ohms 1/16W
R2	ERJ6GEYJ334	Carbon 330K ohms 1/16W
R3	ERJ6GEYJ203	Carbon 20K ohms 1/16W
R4	ERJ6GEYJ124	Carbon 120K ohms 1/16W
R5	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R6	ERJ6GEYJ243	Carbon 24K ohms 1/16W
R7	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R8	ERJ6GEYJ163	Carbon 16K ohms 1/16W
R9	ERJ6GEYJ223	Carbon 22K ohms 1/16W
R10	ERJ6GEYJ104	Carbon 100K ohms 1/16W
R11	ERJ6GEYJ134	Carbon 130K ohms 1/16W
R12	ERJ6GEYJ274	Carbon 270K ohms 1/16W
R13	ERJ6GEYJ222	Carbon 2.2K ohms 1/16W
R14	ERJ6GEYJ223	Carbon 22K ohms 1/16W
R15	ERJ6GEYJ104	Carbon 100K ohms 1/16W
R16	ERJ6GEYJ621	Carbon 620 ohms 1/16W
R17	ERJ6GEYJ562	Carbon 5.6K ohms 1/16W
R18	ERJ6GEYJ621	Carbon 620 ohms 1/16W
R19	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R20	ERJ6GEYJ223	Carbon 22K ohms 1/16W
R21	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R22	ERJ6GEYJ163	Carbon 16K ohms 1/16W
R23	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R24	ERJ6GEYJ334	Carbon 330K ohms 1/16W
R25	ERJ6GEYJ104	Carbon 100K ohms 1/16W
R26	ERJ6GEYJ114	Carbon 110K ohms 1/16W
R27	ERJ6GEYJ222	Carbon 2.2K ohms 1/16W
R28	ERJ6GEYJ223	Carbon 22K ohms 1/16W
R29	ERJ6GEYJ274	Carbon 270K ohms 1/16W
R30	ERJ6GEYJ562	Carbon 5.6K ohms 1/16W
R31	ERJ6GEYJ102	Carbon 1K ohms 1/16W
R32,3	ERJ6GEYJ104	Carbon 100K ohms 1/16W
R34	ERJ6GEYJ184	Carbon 180K ohms 1/16W
R35	ERJ6GEYJ563	Carbon 56K ohms 1/16W
R36	ERJ6GEYJ114	Carbon 110K ohms 1/16W
R37	ERJ6GEYJ473	Carbon 47K ohms 1/16W
R38	ERJ6GEYJ102	Carbon 1K ohms 1/16W
R39	ERJ6GEYJ104	Carbon 100K ohms 1/16W
R40	ERJ6GEYJ304	Carbon 300K ohms 1/16W
R41	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R42	ERJ6GEYJ512	Carbon 5.1K ohms 1/16W
R43	ERJ6GEYJ1104	Carbon 100K ohms 1/16W
R44	ERJ6GEYJ204	Carbon 200k ohms 1/16W
R45	ERJ6GEYJ754	Carbon 750k ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R47,48	YWCR21-153FT	Carbon 15K ohms 1/16W
R49	YWCR32-103FT	Carbon 10K ohms 1/16W
R50	ERJ6GEYJ163	Carbon 16K ohms 1/16W
R51,52	ERJ6GEYJ134	Carbon 130K ohms 1/16W
R53,54	ERJ6GEYJ103	Carbon 10K ohms 1/16W
R55	ERJ6GEYJ913	Carbon 91K ohms 1/16W
R56	YWCR21-202FT	Carbon 2K ohms 1/16W
R57	ERJ6GEYJ132	Carbon 1.3K ohms 1/16W
R58,59	YWCR21-123FT	Carbon 12K ohms 1/16W
R60	ERJ6GEYJ273	Carbon 27K ohms 1/16W
R61	ERJ6GEYJ223	Carbon 22K ohms 1/16W
R62	ERJ6GEYJ513	Carbon 51K ohms 1/16W
R63	ERJ6GEYJ4R7	Carbon 4.7K ohms 1/16W
R64,65	ERJ6GEYJ273	Carbon 27K ohms 1/16W
R66	ERJ6GEYJ4R7	Carbon 4.7K ohms 1/16W
R67	ERJ6GEYJ622	Carbon 6.2K ohms 1/16W
R68	ERJ6GEYJ164	Carbon 160K ohms 1/16W
R69	ERJ6GEYJ154	Carbon 150K ohms 1/16W
R70	ERJ6GEYJ163	Carbon 16K ohms 1/16W
R71	ERJ6GEYJ164	Carbon 160K ohms 1/16W
R72	ERJ6GEYJ622	Carbon 6.2K ohms 1/16W
R73	ERJ6GEYJ102	Carbon 1K ohms 1/16W
R74	ERDS2TJ202	Carbon 2K ohms 1/16W
VR3	EVM-6P-BQ3	Variable Resistor 4.7K ohms
VR4	EVM-6P-B25	Variable Resistor 200K ohms
VR5	EVM-6P-B14	Variable Resistor 10K ohms
C1	ECEA1EU470	Electrrolytic 47 µF 25V
C2	ECEA1CU101	Electrrolytic 100 µF 16V
C3	ECEA1AU470	Electrrolytic 47 µF 10V
C4	CM21Y5V104Z	Ceramic 0.1 µF
C5	CM21RJ100F	Ceramic 10 pF
C6	CM21Y5V104Z	Ceramic 0.1 µF
C7	CM21W5R223M	Ceramic 0.022 µF
C8	ECST1CY105ZR	Electrrolytic 1µF 10V
C9-13	CM21Y5V104Z	Ceramic 0.1µF
C14,15	CM21Y5V103Z	Ceramic 0.01µF
C16,17	ECEA1CU100	Ceramic 10µ16V
RL1	G6E134PUS	Relay
CN1	YW53014-0210	2-pin Connector
CN2	YWB6B-PH	6-pin Connector
CN3	YWB2BPH	2-pin Connector
CN4	YFB7B-PH	7-pin Connector
CN5,6	YWB4BPH	4-pin Connector
CN7	YFB3BPH	3-pin Connector
CN8	YW53014-0210	2-pin Connector
CN9	YWB4BPH	4-pin Connector

REF.NO.	PART NO.	DESCRIPTION
HALL SENSOR BOARD		
PCB2 (NLA)	YW704965A	Printed Circuit Board Assy
IC1	YFOH003HQRTW	Hall Sensor
PHOTO INTERRUPUTER BOARD		
PCB3,4 (NLA)	YW704969A	Printed Circuit Board Assy
PC1	YWP3784	Photo Interruputer
ACCESSORY PARTS/PACKAGING PARTS		
M31	YWV8QA1842AN	Operating Instructions
M33	YWV9CA1303AN	Packaging
M34	YWV8FA0140A4	Packing Label

MICROPHONE UNIT

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
E1	YWMLKA0363A4	Microphone Connector
MIC1	YWM0EA0079A4	Mic assy
M1	YWM5KA0898A3	Upper Case
M2	YWM5KA0899A3	Bottom Case
M3	YWM5KB0180A3	Head Case
M5	YWM7QB1815A4	Main Label
M6	YWM5RA0254A4	Switch Knob
M7	YWM2TA0181A4	Mounting Bracket
M8	YWM2HA0741A4	Shield Parts
M9	YWM2HA0742A4	Shield Parts
M10	YWM2FA0415A4	Cushion
M11	YWM6CA0082A4	Wind Screen
M12	YWM7AA0247A4	Sound Filter
M13	YWM7AA0248A4	Sound Filter
M14	YWM1EA0153A4	Special Screw
M15	YWM2XA0054A4	Mic Cord Assy

MAIN BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB1	YWMPRA1631A4	Printed Board	
Q1,2	2SC2785-FE	Transistor	
D1-3	YWHZS7.5EB2	Diode	
R1,2	ERDS2TJ471	Carbon	470 ohms 1/4W
R3,4	ERDS2TJ562	Carbon	5.6K ohms 1/4W
R5	ERDS2TJ473	Carbon	47K ohms 1/4W
R6	ERDS2TJ102	Carbon	1K ohms 1/4W
R7	ERDS2TJ473	Carbon	47K ohms 1/4W
R8	ERDS2TJ102	Carbon	1K ohms 1/4W
C1,2	ECEA1AKK100	Electrolytic	10 µF 6.3V
C3-6	ECQM1H473JZ	Plastic	0.047 µF 50V
C7-10	ECEA1AKK100	Electrolytic	10 µF 6.3V
C11	ECEA0JS470	Electrolytic	47 µF 6.3V
C12,13	UAT04X102M	Ceramic	1000 pF
SW1	ESD10224	Slide Switch	

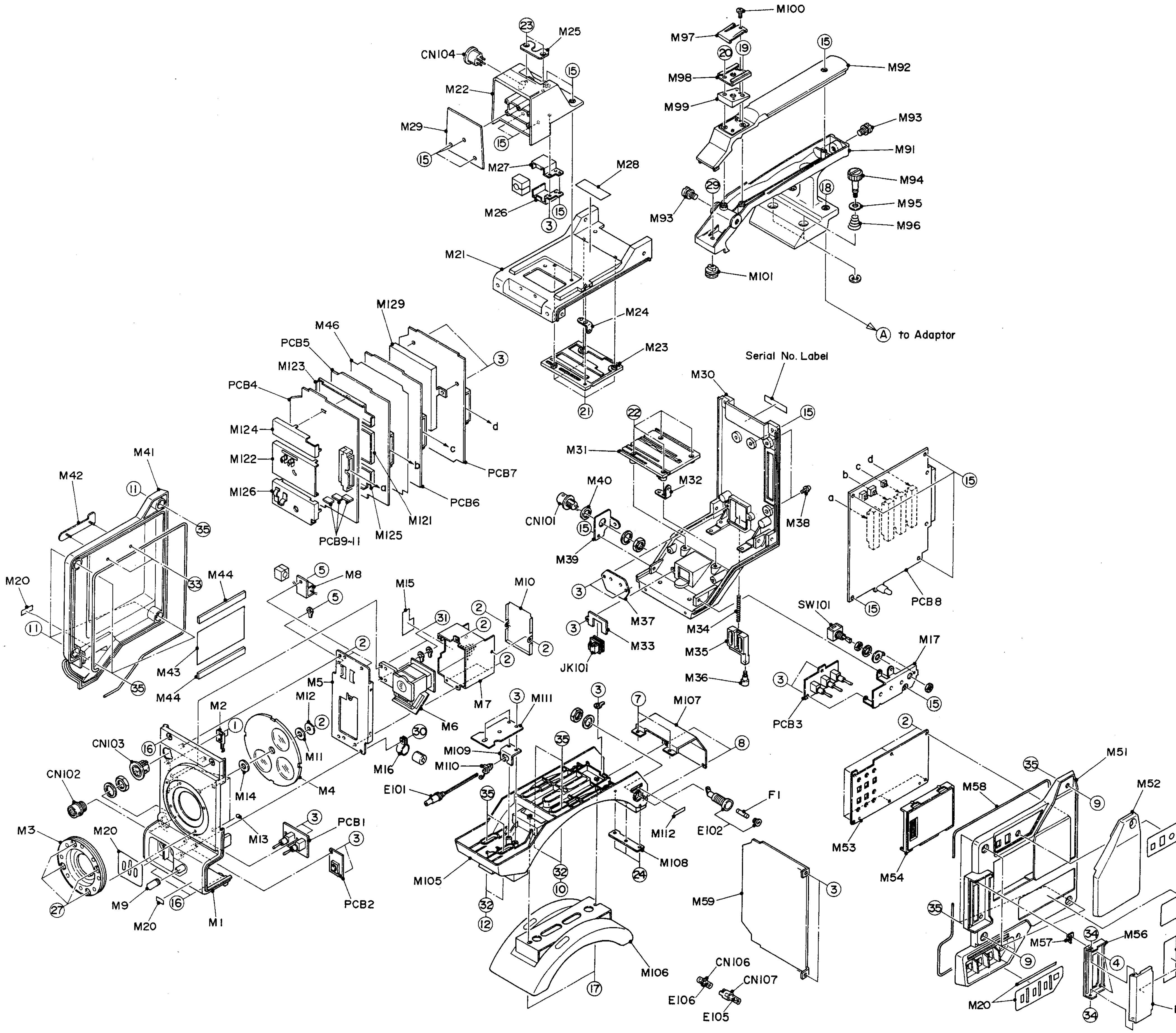
ACCESSORY PARTS/PACKAGING PARTS

REF.NO.	PART NO.	DESCRIPTION
M21	YWM8QA1815A4	Operating Instructions
M22	YWM8BB0183A4	Packaging
M23	YWT20X25C03	Polyethylene Bag

ACCESSORY PARTS/PACKAGING PARTS for WV-F70

REF.NO.	PART NO.	DESCRIPTION
M151	YWV8QA1764AN	Operating Instructions
M152	YWV8RA0233A4	Coution Label
M153	XZB26X40C05	Polyethylene Bag for Printed
M154	XZB55X71C1	Polyethylene Bag for Camera Head
M155	YWT10X16C03	Polyethylene Bag
M156	YWT10X35C03	Polyethylene Bag for Microphone
M157	YWT20X25C03	Polyethylene Bag for 1.5" EVF
M158	YWV9CA1275AN	Packaging

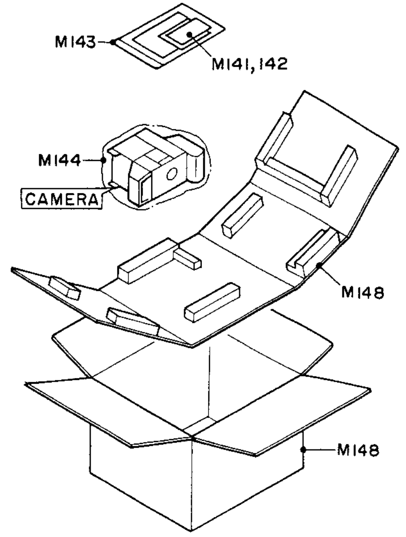
EXPLODED VIEW OF CAMERA HEAD


M100
M97
M98
M99
M92
M93
M91
M94
M95
M96
M101
to Adaptor
CN104
M25
M22
M29
M27
M28
M26
M21
M24
M23
M129
M46
PCB5
M123
PCB4
M124
M122
M126
PCB9~11
M125
M121
PCB6
PCB7
a
b
c
d
Serial No. Label
M30
M31
M32
M38
CN101
M40
M39
M37
M33
JK101
M34
M35
M36
PCB8
SW101
M17
PCB3
M42
M41
M20
M44
M43
M8
M15
M10
M5
M7
M6
M2
M12
M11
M111
M107
CN103
CN102
M3
M20
M9
M1
M14
M13
M4
PCB1
PCB2
M16
E101
M109
M110
M105
M112
M108
E102
F1
M106
CN106
CN107
E106
E105
M53
M54
M58
M59
M51
M52
M20
M57
M56
M55

○ Numbers show screws.

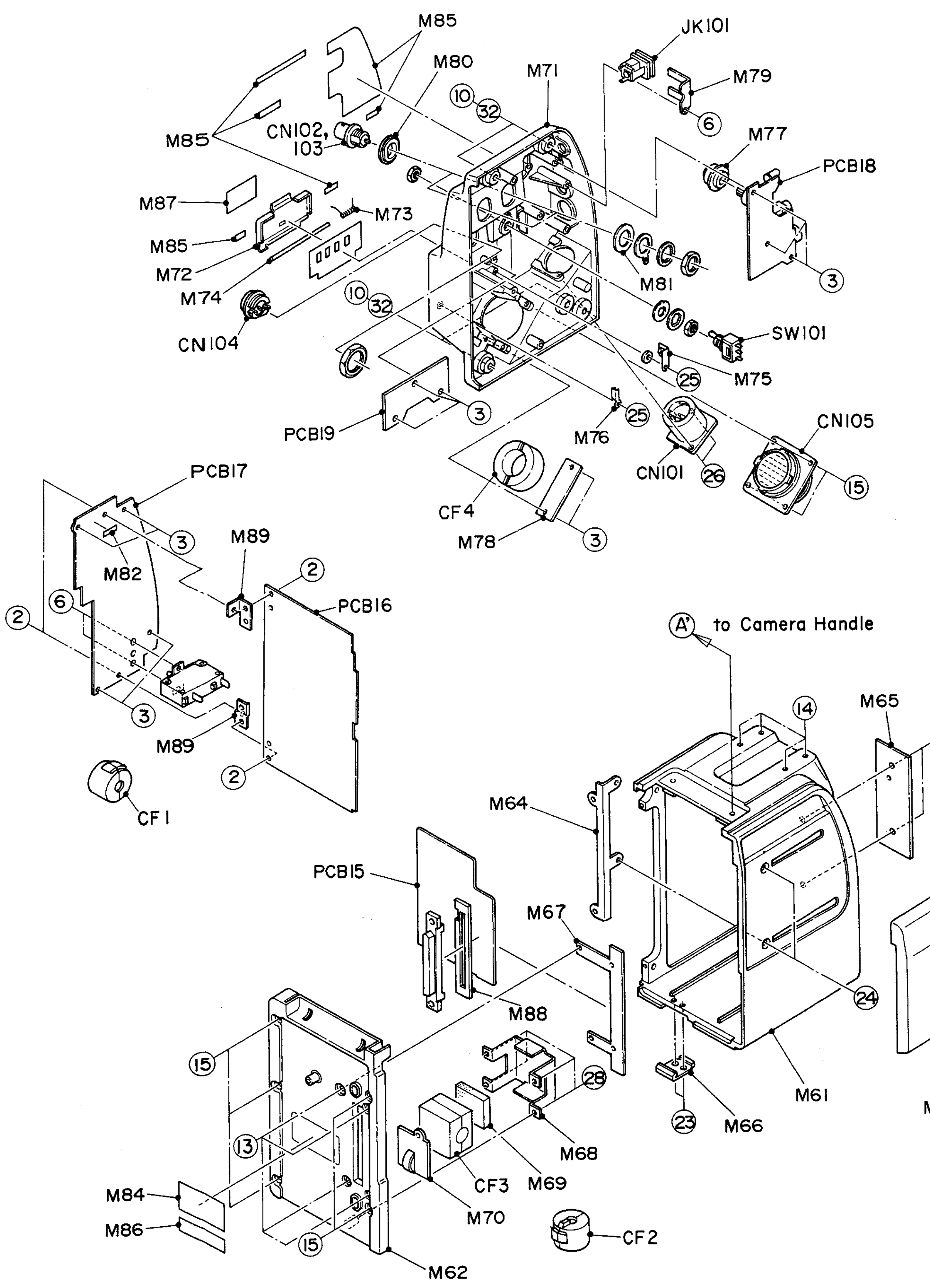
No.	Screws	Description
①	XSB2 + 4FX	Binding Head Screws
②	XSB26 + 4FX	Binding Head Screws
③	XSB26 + 6FX	Binding Head Screws
④	XSB26 + 6FN	Binding Head Screws
⑤	XSB3 + 4FX	Binding Head Screws
⑥	XSB3 + 6FX	Binding Head Screws
⑦	XSB3 + 6FN	Binding Head Screws
⑧	XSB3 + 8FN	Binding Head Screws
⑨	XSB4 + 8FN	Binding Head Screws
⑩	XSB4 + 10FN	Binding Head Screws
⑪	XSB4 + 12FN	Binding Head Screws
⑫	XSB4 + 14FN	Binding Head Screws
⑬	XSB26 + 4FXK	Binding Head Black Screws
⑭	XSB26 + 6FXK	Binding Head Black Screws
⑮	XSB3 + 6FXK	Binding Head Black Screws
⑯	XSB3 + 8FXK	Binding Head Black Screws
⑰	XSB4 + 6FXK	Binding Head Black Screws
⑱	XSB4 + 8FXK	Binding Head Black Screws
⑲	XSS2 + 6FX	Flush Head Machine Screws
⑳	XSS2 + 10FX	Flush Head Machine Screws
㉑	XSS26 + 6FX	Flush Head Machine Screws
㉒	XSS26 + 8FX	Flush Head Machine Screws
㉓	XSS3 + 6FN	Flush Head Machine Screws
㉔	XSS3 + 6FXK	Flush Head Black Machine Screws
㉕	XSN2 + 4FX	Pan Head Machine Screws
㉖	XSN26 + 6FN	Pan Head Machine Screws
㉗	XSN4 + 6FN	Pan Head Machine Screws
㉘	XTN26 + 6FX	Pan Head Tapping Screws
㉙	XYM3 + F6FXK	Machine Screw and Washer Ass'y
㉚	XYN26 + F8FX	Machine Screw and Washer Ass'y
㉛	XYN3 + C8FX	Machine Screw and Washer Ass'y
㉜	XWC4BFX	External Toothed Lock Washer
㉝	XNG2EFX	Hexagon Head Nuts
㉞	XPJ16C6V	Spring Pin
㉟	O-Ring P3	Washer

PACKAGING


M143
M141, 142
M144
CAMERA
M148
M148

EXPLODED VIEW

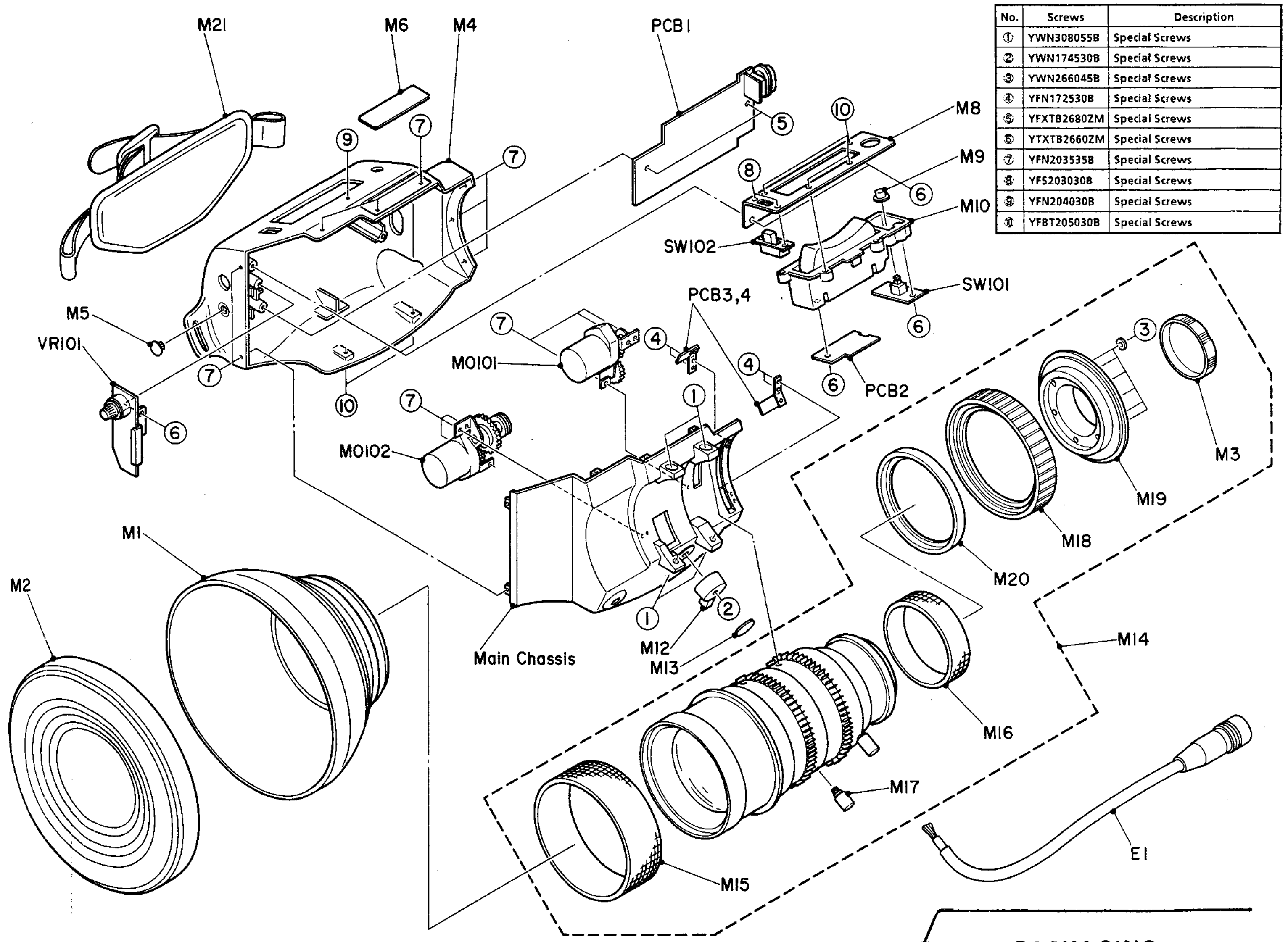
CAMERA ADAPTOR


M85
M80
M71
JK101
M79
⑩
㉜
CN102,
103
M77
PCB18
M85
M87
M73
M85
M72
M74
CN104
⑥
③
M81
⑩
㉜
SW101
M75
㉕
M76
㉕
CN101
㉖
CN105
⑮
PCB19
③
CF4
M78
③
PCB17
③
M89
M82
②
⑥
②
PCB16
③
M89
②
CF1
Ⓐ' to Camera Handle
⑭
M65
㉔
M64
PCB15
M67
㉔
M88
⑮
⑬
M84
M86
⑮
M62
M70
CF3
M69
M68
㉘
CF2
㉓
M66
M61
M63

12X SERVO CONTROL ZOOM LENS

○ Numbers show screws.

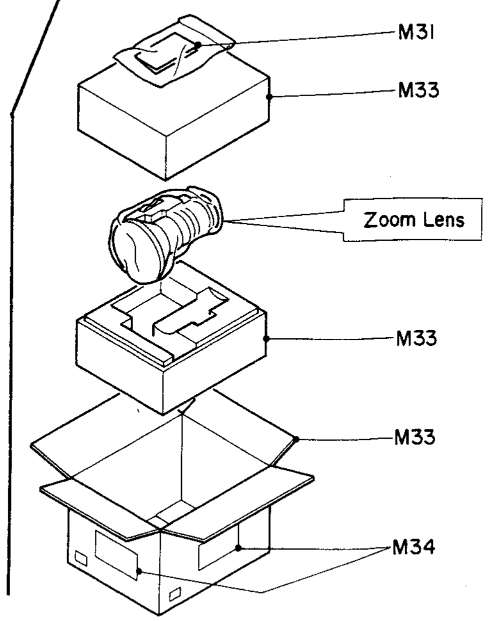
No.	Screws	Description
①	YWN308055B	Special Screws
②	YWN174530B	Special Screws
③	YWN266045B	Special Screws
④	YFN172530B	Special Screws
⑤	YFXTB2680ZM	Special Screws
⑥	YTXTB2660ZM	Special Screws
⑦	YFN203535B	Special Screws
⑧	YFS203030B	Special Screws
⑨	YFN204030B	Special Screws
⑩	YFBT205030B	Special Screws


M21
M6
M4
PCB1
⑨
⑦
⑦
⑤
⑩
M8
M9
⑧
⑥
M10
SW102
SW101
⑥
PCB3,4
④
④
⑦
M0101
⑦
M0102
①
⑥
PCB2
③
M3
M19
M18
M20
M5
VR101
⑦
⑩
⑥
M1
M2
Main Chassis
①
②
M12
M13
M14
M16
M17
M15
E1

○ Numbers show screws.

No.	Screws	Description
①	XSB2 + 4FX	Binding Head Screws
②	XSB26 + 4FX	Binding Head Screws
③	XSB26 + 6FX	Binding Head Screws
④	XSB26 + 6FN	Binding Head Screws
⑤	XSB3 + 4FX	Binding Head Screws
⑥	XSB3 + 6FX	Binding Head Screws
⑦	XSB3 + 6FN	Binding Head Screws
⑧	XSB3 + 8FN	Binding Head Screws
⑨	XSB4 + 8FN	Binding Head Screws
⑩	XSB4 + 10FN	Binding Head Screws
⑪	XSB4 + 12FN	Binding Head Screws
⑫	XSB4 + 14FN	Binding Head Screws
⑬	XSB26 + 4FXK	Binding Head Black Screws
⑭	XSB26 + 6FXK	Binding Head Black Screws
⑮	XSB3 + 6FXK	Binding Head Black Screws
⑯	XSB3 + 8FXK	Binding Head Black Screws
⑰	XSB4 + 6FXK	Binding Head Black Screws
⑱	XSB4 + 8FXK	Binding Head Black Screws
⑲	XSS2 + 6FX	Flush Head Machine Screws
⑳	XSS2 + 10FX	Flush Head Machine Screws
㉑	XSS26 + 6FX	Flush Head Machine Screws
㉒	XSS26 + 8FX	Flush Head Machine Screws
㉓	XSS3 + 6FN	Flush Head Machine Screws
㉔	XSS3 + 6FXK	Flush Head Black Machine Screws
㉕	XSN2 + 4FX	Pan Head Machine Screws
㉖	XSN26 + 6FN	Pan Head Machine Screws
㉗	XSN4 + 6FN	Pan Head Machine Screws
㉘	XTN26 + 6FX	Pan Head Tapping Screws
㉙	XYM3 + F6FXK	Machine Screw and Washer Ass'y
㉚	XYN26 + F8FX	Machine Screw and Washer Ass'y
㉛	XYN3 + C8FX	Machine Screw and Washer Ass'y
㉜	XWC4BFX	External Toothed Lock Washer
㉝	XNG2EFX	Hexagon Head Nuts
㉞	XPJ16C6V	Spring Pin
㉟	O-Ring P3	Washer

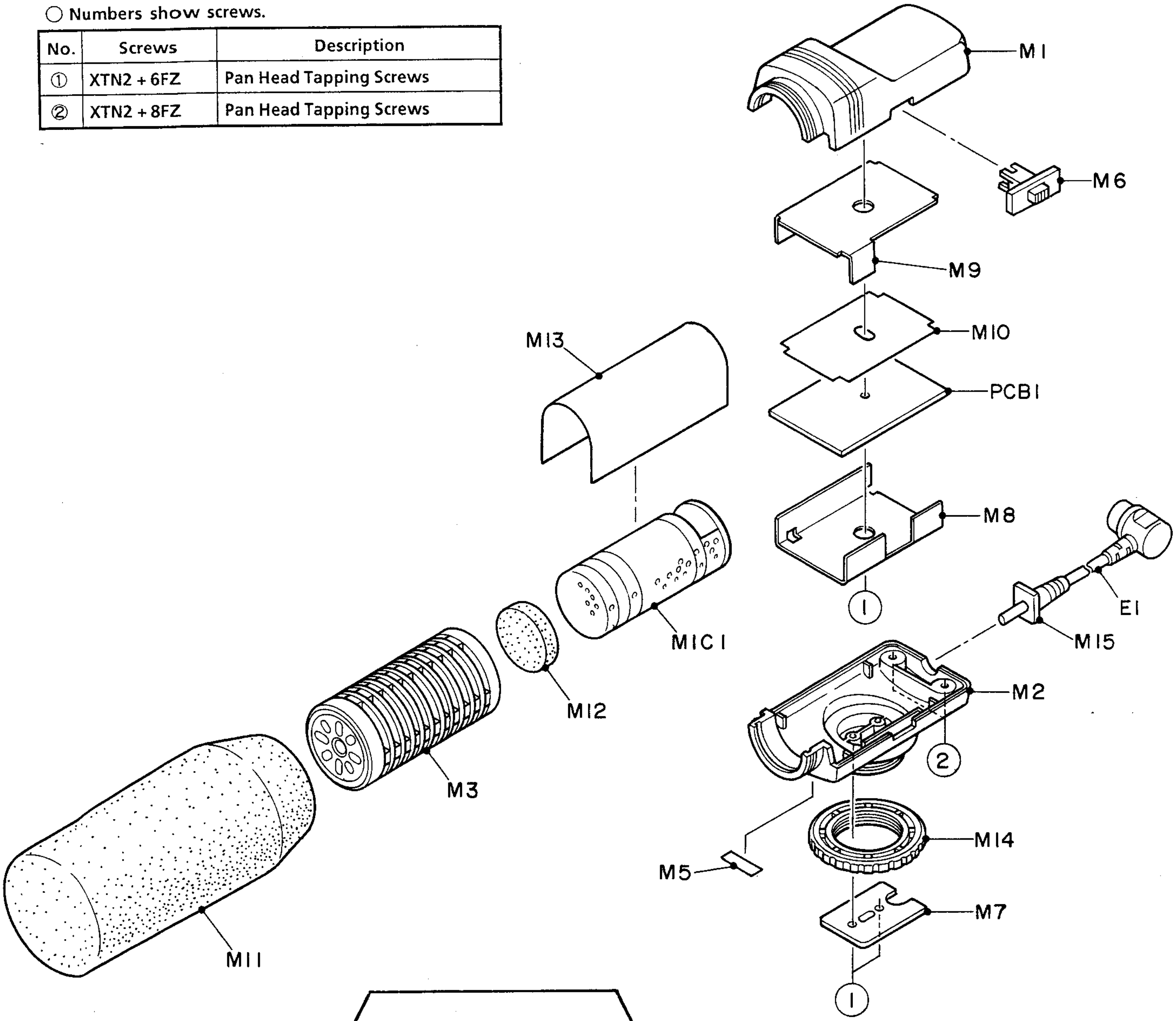
PACKAGING

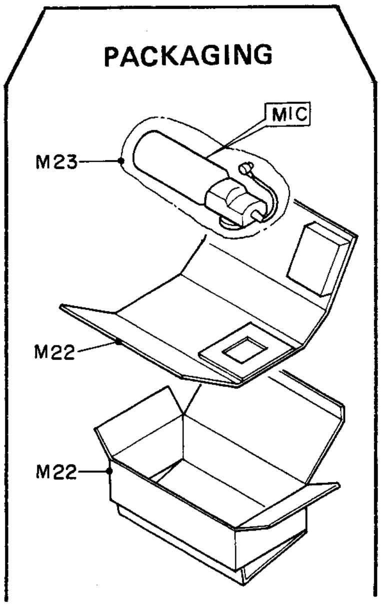

M31
M33
Zoom Lens
M33
M33
M34

EXPLODED VIEW OF MICROPHONE

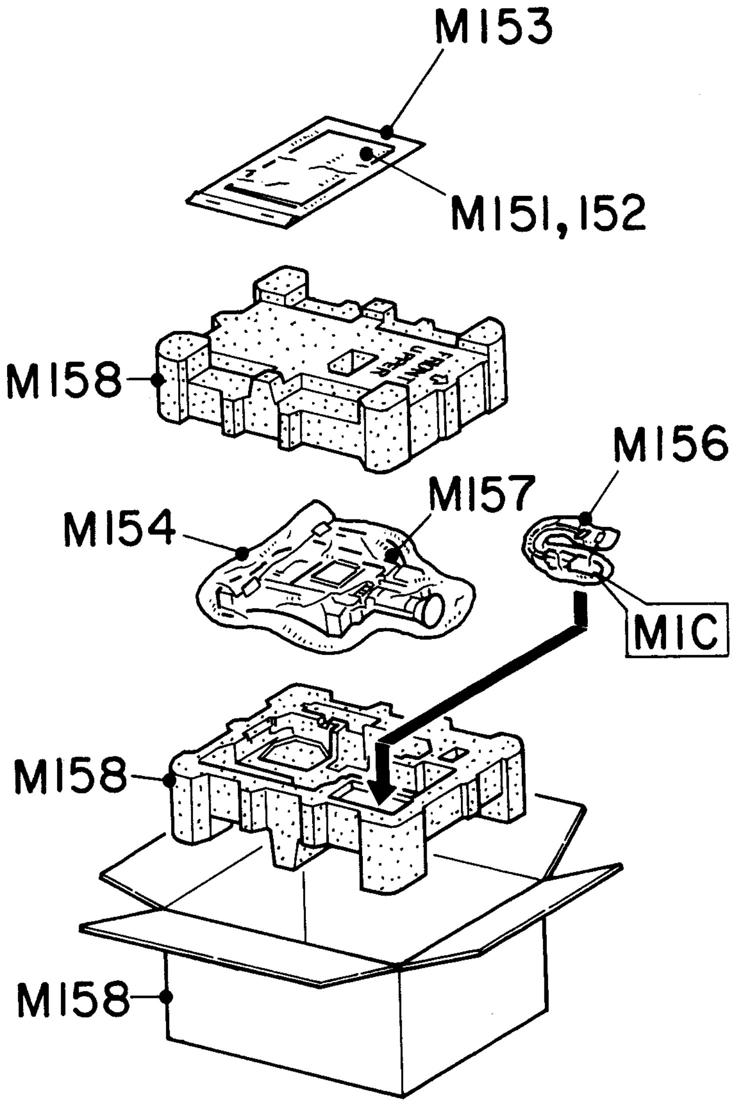
○ Numbers show screws.

No.	Screws	Description
①	XTN2 + 6FZ	Pan Head Tapping Screws
②	XTN2 + 8FZ	Pan Head Tapping Screws


M1
M6
M9
M10
M13
PCB1
M8
E1
①
MIC1
M15
M2
M12
②
M3
M14
M5
M7
M11
①


PACKAGING
MIC
M23
M22
M22

PACKAGING OF WV-F70


M153
M151, 152
M158
FRONT
UPPER
M156
M157
M154
MIC
M158
M158

1039P

ORDER NO. AVS9601103S8

Service Manual

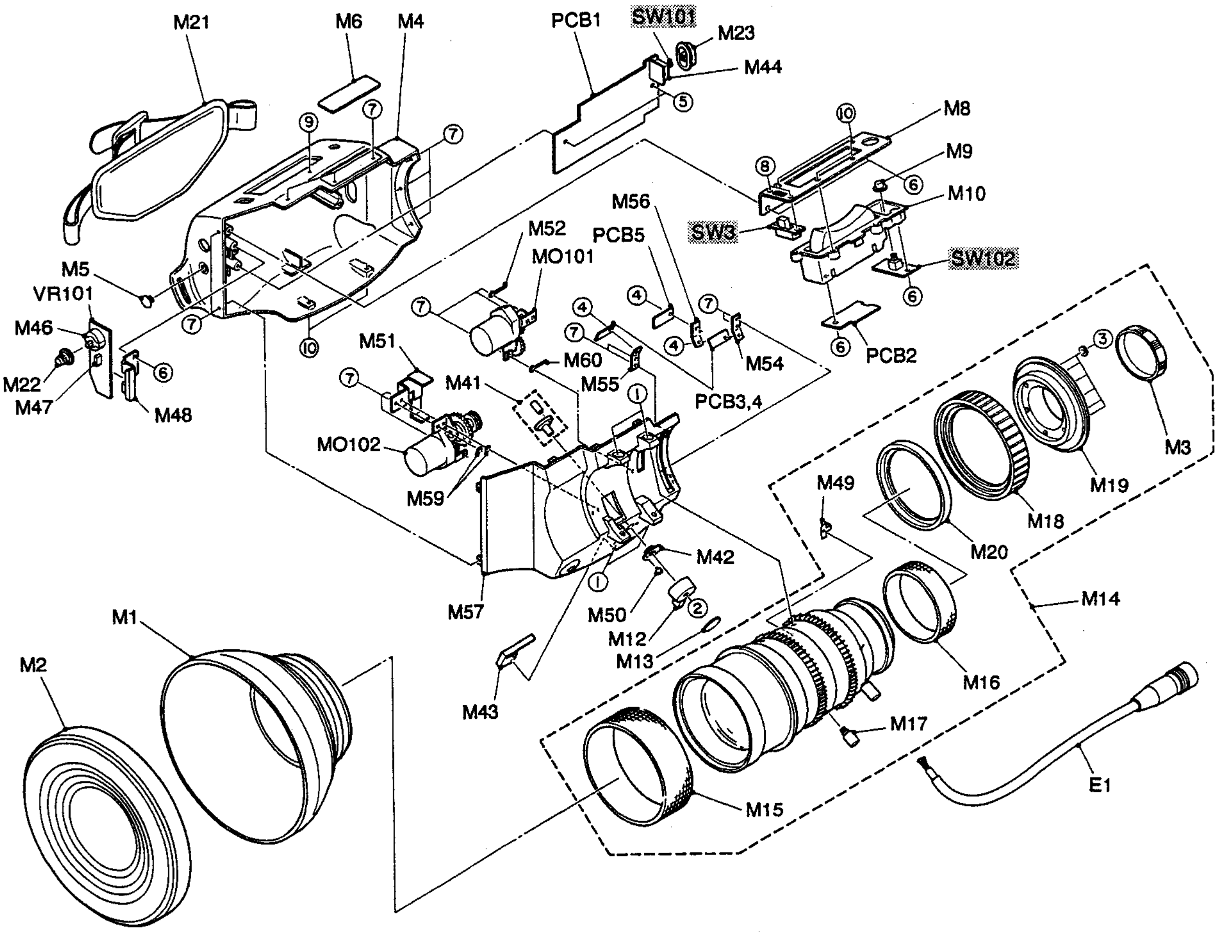
Colour Video Camera
WV-F70 Series

Supplement-3

Please file and use this supplement service manual together with the service manual for Model No.WV-F70, Order No. AVS8904185C8.

- **This supplement service manual corrections for service manual of Servo Control Zoom Lens WV-LZ70/12.**
  - Reference number of Exploded view have been corrected.
  - Reference number and Description of Replacement parts list have been corrected.

EXPLODED VIEW



M21
M6
M4
PCB1
SW101
M23
M44
⑤
⑩
M8
⑨
⑦
⑦
⑧
M9
⑥
M10
M56
SW3
M52
PCB5
MO101
SW102
⑥
M5
VR101
⑦
⑩
⑦
④
④
⑦
⑦
③
M46
M22
M47
⑥
M48
M51
④
M60
M54
⑥
PCB2
M3
⑦
M41
M55
①
PCB3,4
MO102
M59
M49
M19
M18
M20
M42
M57
①
M50
②
M12
M13
M14
M1
M2
M43
M16
M17
M15
E1

Panasonic

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
MISCELLANEOUS		
SW3	YW106035A	IRIS Control Selection Switch
SW101	YW704967A	VTR Start/Stop Switch Ass'y
SW102	YW704970	RET/REC Check Switch Ass'y

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